THE IRON AGE

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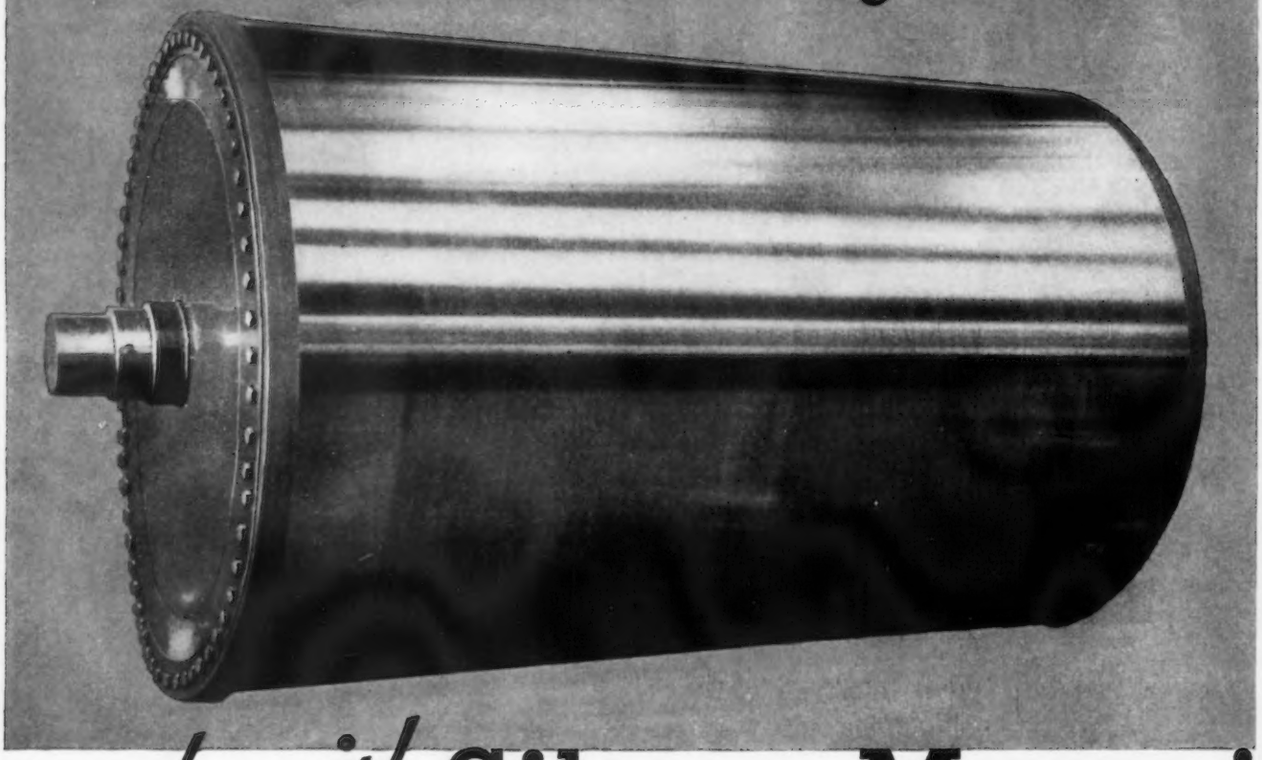

made with Silvery Mayari

A 10-ft.-diameter dryer roll—of heavy wall thickness, and its diameter twice that of the dryer rolls commonly used in American plants—was ordered recently from the Pusey and Jones Corporation, Wilmington, Delaware. A requirement was that this roll had to be flawless, without a pin-point pore in its more than 400 square feet of surface. Naturally it presented unusual problems. To obtain the best possible casting, the foundry turned to Silvery Mayari.

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Silvery Mayari opens the way to the production of fine-grained, easy-machining, high-test castings from mixtures containing as much as 80 per cent of steel scrap—and does it without complicated cupola practice and without the addition of expensive alloys at ladle or spout.

We suggest that interested foundrymen communicate with Bethlehem foundry specialists about the use of Silvery Mayari for better, more economical high-test castings for every purpose.

★ ★

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Wanted; a Bridge

THE American public is essentially fair-minded. It forms its opinions on the facts, when facts are made available. And the expression of these opinions, thus formed, has great weight among legislators and public administrators, who remain in office by keeping their "ears to the ground."

Take the case of the automobile industry, which has left no stone unturned to interpret its case to the public. As a result, it has been signally immune from some of the plagues and torments that have afflicted other branches of industry under the "New Delirium."

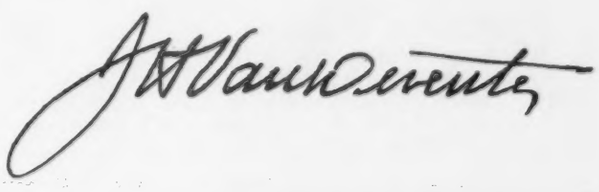
For example, it was the one industry permitted to interpret 7-a through a "merit clause" and to keep this intact through code renewal. It is the one industry with which the President has "taken sides" as against organized labor dictation, in the settlement of the threatened strike in 1934, in his ruling against majority control of minorities and in his recent upholding of the Automobile Labor Board.

Voting on collective bargaining in many industries has been dictated by Government along lines partial to organized labor. Not so in the automobile industry, where impartial elections have been held.

In February of this year, the automobile industry obtained **tariff reductions on exports** of cars and parts to Belgium (and hence to other "most favored nations") of 15 and 80 per cent respectively. Steel, cement and other industries, on the contrary, were handed tariff reductions on competing **imports** from Belgium.

The public has come to understand and appreciate the automobile industry. It does not, as yet, appreciate and understand its equally important dependence upon capital goods and raw materials.

The public is but one step removed from the automobile industry. It is two or more steps away from capital goods and raw materials. But these steps can and must be bridged. And even if the building of that bridge, in the form of public education, should cost several millions of dollars, it would be an extremely profitable investment in life insurance for the industries involved.



Electric-Furnace Brazing Process Finds New Uses

By H. M. WEBBER
Industrial Department, General Electric Co.

APPLICATIONS of furnace brazing in sewing machine, business machine and refrigerator manufacture are outlined in this review. Advantages cited include increase in strength and life of machine parts and lowering of production and servicing costs.

THE purpose of this article is to point out new applications of the electric - furnace brazing process and to present them as a brief review of progress made during the last two years.

A manufacturer of industrial sewing machines has applied electric-furnace brazing with success in the making of parts subject to extreme vibration. The sewing machines make as high as 6000 stitches a minute, at which speeds many of the parts formerly worked loose in service when assembled by the ordinary methods of riveting, pinning, and torch brazing. Electric-furnace brazing has eliminated this difficulty, producing solidly joined parts which give continuous service. And, in addition to increasing the strength and life of the parts, the new process has been found to reduce both production and service costs.

Fig. 1 shows a tension release which was formerly made by riveting four steel bars into a long, flat punching. Although this was an inexpensive method of fabricating the assembly, the parts worked loose in service. This meant shutting down the machines for replacements. These assemblies are now being brazed in an electric furnace. Because of the resulting high strength of the joints, the difficulty mentioned has been overcome and, as a result, savings of both time and money have been realized.

In the new method of fabricating the tension release, the cross bars are riveted in place as before, and in addition a copper-powder paste is daubed around the joints

FIG. 1—At *A* is shown a tension release for industrial sewing machines, the cross bars of which are riveted and copper-brazed into long flat punchings. At *B* is shown a furnace-brazed assembly of a bevel gear and tubular shaft formerly machined from solid stock.

to serve as brazing metal. The assemblies are then loaded on to a lightweight tray and are placed in the heating chamber of the box-type, controlled-atmosphere electric furnace pictured in Fig. 2, which operates at 2100 deg. F. In the heating chamber the copper melts, flows into the joints by the aid of capillary attraction, and forms alloys with the steel. The tray-load of assemblies is then pushed into the controlled-atmosphere cooling chamber, where the alloys solidify and form strong, ductile bonds. When the parts are taken from the cooling chamber they are clean and bright and are ready for subsequent operations without requiring cleaning treatments.

FIG. 2—Tray-loads of assemblies to be brazed are charged into this box-type, controlled-atmosphere electric furnace where the brazing metal melts, flows into the joints and forms alloys with the body metal.

Brazed Assemblies Replace Parts Machined from Bar Stock

Savings have also been made by the same company by substituting electric-furnace brazed assemblies for parts formerly machined from solid bar stock. The bevel gear and shaft assembly, shown at *B* in Fig. 1, represents a typical case. Formerly this part was machined from one piece of steel, but now the small gears and hollow shafts are made up separately, then simply pressed together and electric-furnace brazed. By eliminating the machining operations in the new method of fabricating, the production costs have been lowered.

Assemblies formerly torch-brazed are now successfully electric-furnace brazed, the parts fabricated by the latter method being uniformly strong and requiring no cleaning after brazing. With the torch-brazing method employed rejections were high and many of the parts worked loose in service. Cleaning the assemblies after brazing was expensive. With the electric-furnace brazing, the life of the parts has been considerably increased and savings have been made in both production and service costs.

A business-machine manufacturer is using the electric-furnace brazing process in the fabrication of parts such as the gear-ratchet assemblies shown in Fig. 3. Formerly the hub shoulders of the gear were riveted and stake-pinned to the ratchets. Now the parts are simply pressed together and copper-brazed in a box-type electric furnace similar to that shown in Fig. 2. As a result, the assemblies have greater strength and longer life, with lower costs.

Three other business-machine manufacturers are making new uses of the process in the fabrication of hundreds of different assemblies, such as levers with hubs, cam clusters, gear clusters, etc. One company states that it has been able to increase the strength of parts by as much as 287 per cent over that obtained by former methods of assembly, making it possible to build many parts with smaller and lighter sections with a corresponding reduction in the space requirements and inertia of the parts.

At *A* in Fig. 4 is shown a lever with a hub and two studs. The hub-lever assembly was formerly drilled and stake-pinned, but now the hub is simply pressed into the lever, a copper-wire ring is placed over the hub, and the assembly is electric-furnace brazed. The two studs, which are now being riveted as before, are in addition being electric-furnace brazed at the same time as the rest of the assembly passes through the furnace, the process resulting in a material strengthening of the joints. Electric-furnace brazing has made possible appreciable savings in the manufacture of such parts by the elimination of drilling and pinning operations, by the elimination of drilling jigs in some cases, and by

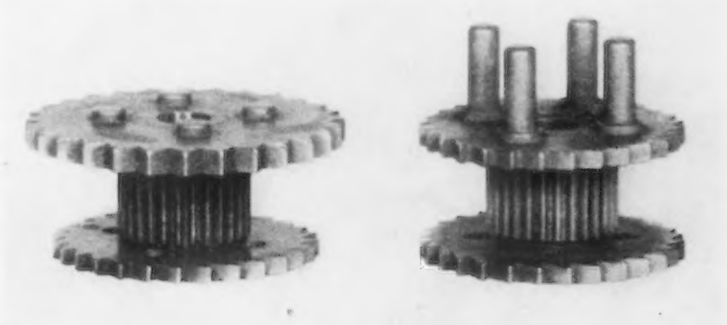


FIG. 3—The hub shoulders of the gear in this assembly were formerly riveted and stake-pinned to the ratchets. The parts are now simply pressed together and electric-furnace brazed.

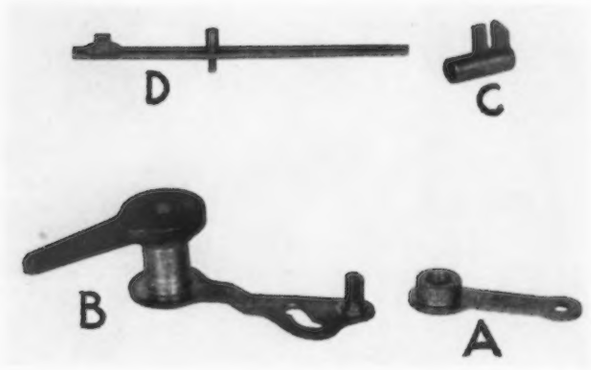


FIG. 4—Four assemblies copper-brazed in a controlled-atmosphere furnace. The strength of the hub assembly *A*, which was formerly pinned, has been markedly increased by copper brazing. The pointer-lever *B*, also formerly pinned, is now electric-furnace brazed. The small machine part shown at *C* is inexpensively made from a punching and a short piece of grooved rod. In assembly *D*, copper-wire rings placed over the studs supply the brazing metal.

the elimination of service calls formerly necessitated by the parts working loose in the field. In one factory the production savings are of the order of 30 to 90 per cent of the former costs of drilling, pinning, etc.; the actual savings vary from 40c. per 100 pieces to $10 per 100 pieces.

A more complicated assembly consisting of a pointer and a lever which are electric-furnace brazed to a hollow shaft is illustrated at *B*, Fig. 4. A stud is also brazed to the lever. During assembly the pointer and levers are pressed over the ends of the shaft and indexed. Then the ends of the shaft are peened to make sure that this indexing will remain accurate throughout the brazing operation.

The electric-furnace brazed assembly, shown at *C*, consists of an inexpensive punching pressed into a milled slot in a piece of round rod ¼ in. in diameter by ¾ in. long.

At *D*, Fig. 4, is pictured a small bar 3/16 in. wide by 3¼ in. long. Near the center is a stud which has been pressed into a hole and electric-furnace brazed. At one end a rectangular stud has been pressed through a disk and the bar, then riveted on the under-side, and brazed.

Refrigerator Parts Copper-Brazed

In the General Electric Company's Schenectady works, where the electric-furnace brazing process was developed, a mesh-belt conveyor-type furnace, Fig. 5, is being employed in the manufacture of parts for refrigerators. Six different copper-brazed parts are now being used in the refrigerating machines. It is interesting to note that, although approximately one and a half million refrigerating machines with brazed parts are now in service, failure of the copper-brazed joints is practically unknown.

Fig. 6 shows a hollow piston, made of two pieces of seamless steel tubing and a steel disk. As the pistons come from the brazing furnace, they are tested for leaks by immersion in Transil oil in glass cylinders which are subjected to a high vacuum. The tiniest of leaks causes a series of bubbles to rise in the oil which can readily be observed by the operators. So uniformly tight are the copper brazed

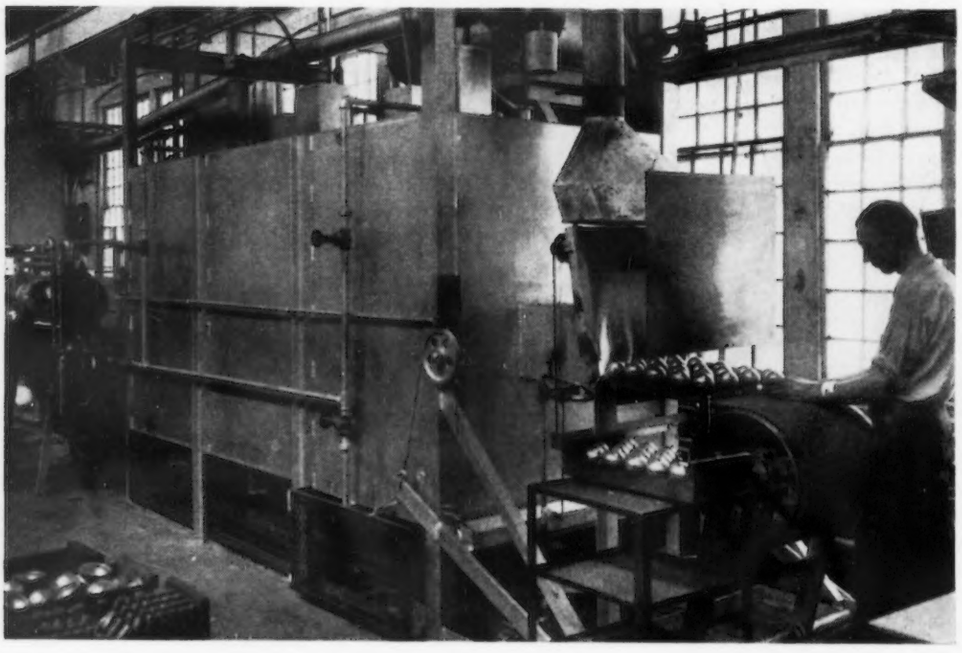
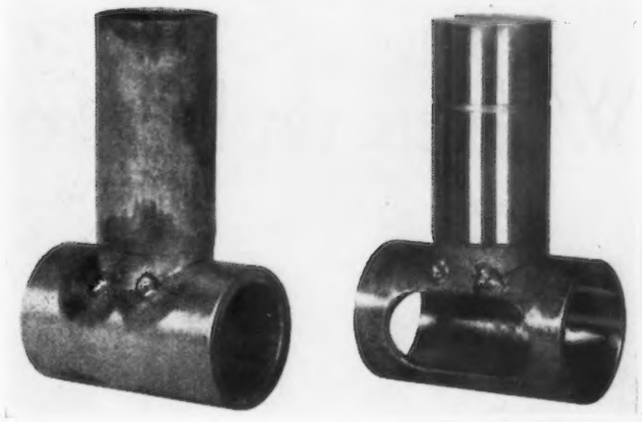


FIG. 5—Mesh-belt, conveyor-type furnace used for brazing and bright annealing. The conveyor is 20-in. wide, the heating chamber is 8-ft. long and the cooling chamber, 24-ft. long. The furnace is rated at 88 kw.



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ABOVE

FIG. 6—This hollow piston for General Electric refrigerating machine is made of two pieces of steel tubing and a disk, copper-brazed in the electric furnace shown in Fig. 5. The part is shown before and after machining.

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BELOW

FIG. 7—Intake muffler (at right) and its component parts, which are pressed together and furnace brazed.

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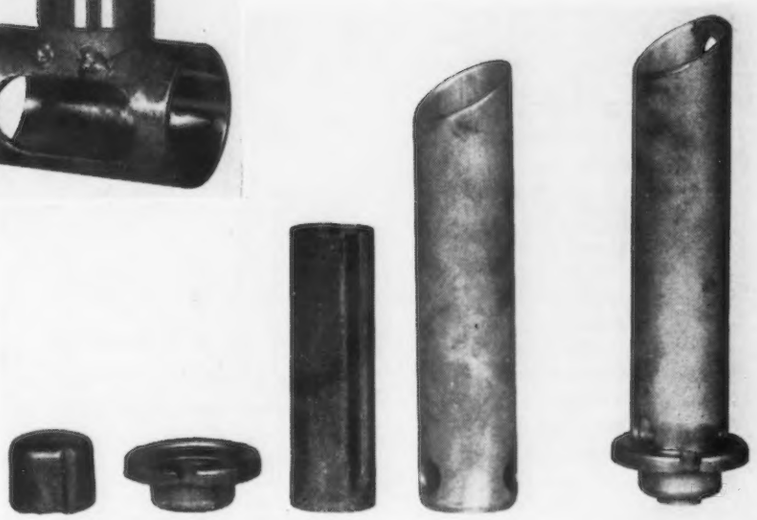


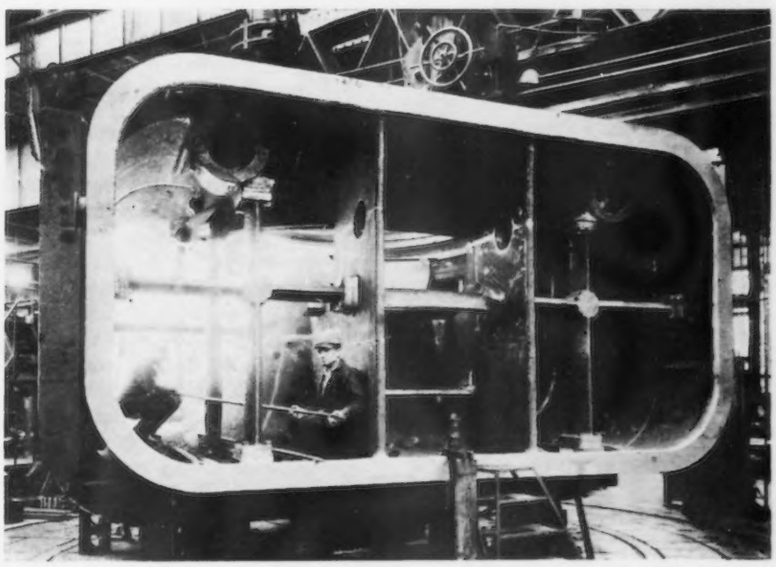
joints that less than two-tenths of 1 per cent of the pistons are rejected in this vacuum test. After being tested, the pistons undergo a number of grinding and machining operations and finally present the appearance shown at the right in Fig. 6.

Fig. 7 shows an intake muffler for the refrigerating machine, composed of four parts: a piece of tubing, a grooved baffle, a cap, and a cup. Copper-wire rings are placed near the joints as the parts are assembled. The brazed assemblies come from the furnace having an appearance such as that shown at the right in Fig. 7.

The mesh-belt conveyor-type electric furnace in which the refrigerating-machine parts are copper brazed (Fig. 5), has a belt conveyor 20 in. wide and will accommodate work up to 10 in. in height. Its electrical rating is 88 kw. The protective atmosphere is supplied by a G-E combustion-type furnace-atmosphere controller which reforms a mixture of city gas and air.

TWO JOBS AT ONCE

LIKE a merry-go-round this exhaust hood for a large steam turbine, under construction at the Schenectady works of General Electric Co., revolves on a perpendicular axis while it is being machined. At the same time workmen light up its gloomy interior and go to work on the inner walls.



Qualifying Welders on Basis of

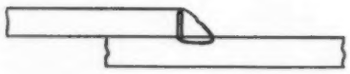


FIG. 1—Lap Weld—a simple test that will reveal a great deal about one operator.

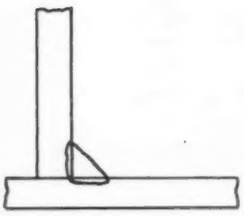


FIG. 2—Fillet Weld—the second test—should be judged on the basis of absence of undercutting and other details.

FIG. 3—Making a butt weld in the horizontal position is the third test. This weld should show good fusion.

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By E. W. P. SMITH

Consulting Engineer
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THE fabrication of welded products involves three more or less distinct operations. These are preparation of the parts, welding, and the subsequent treatment. The subsequent treatment may be heat treatment, machining, or such minor operations as painting before final shipment.

There is another item in which the customer is vitally interested, and that is the service life. In order that the part may adequately and satisfactorily meet all the conditions of the design, it must have an adequate service life. This service life may be looked upon as the summation of all the materials and processes put into the product—particularly in those cases where property damage or even loss of human life might result from failure of the part.

It is necessary, of course, to know that the welding is properly done. It should be clearly borne in mind, however, that because the welding itself is properly done there is no assurance that the service life of the equipment will be satisfactory. In order to determine, or at least to forecast, the future performance of the product, it is necessary to know that all other processes are also competently performed.

The "Human Element"

A large number of codes and qualification tests have been imposed on welding. Control of the so-called "human element" has been the reason given. "How do you know what is in the weld?" "How can you tell whether it is going to do the job satisfactorily?" These and similar questions are asked, without giving consideration to the fact that in other processes and other activities of life the human element also enters, in some cases to a very much greater degree than in welding. Why not be logical, consider that this question of human element also enters into other manufacturing operations, and state that the object of the qualification test is to obtain a product of superior quality and service life.

In a great many activities in the industrial world this is the attitude taken. Results are what are desired, not just a method of inspection and testing. Take a great university, for instance. It has great numbers of students who are given examinations regularly. It is possible that if a student fails he can, at least in some cases, be reexamined. The faculty knows what the student is doing — it knows his capabilities — what course of study he has pursued, and therefore knows what to give him in the examination. A freshman is not given an examination in advanced psychology; a liberal arts student doesn't have to answer questions relating to bridge design. The work the entering student has to do is fitted to his

Job Requirements

A BROADER viewpoint as regards qualification of welders is advocated by Mr. Smith. Service life and the satisfactory meeting of design requirements — in other words, the final result — should be the primary objective. From this viewpoint, both the job and the operator are subject to classification, with qualification test based upon the particular class of work to be done. It is ridiculous, he points out, to require high grade welding on relatively low grade work. Qualifying tests that are more complicated than necessary to meet design requirements add to welding costs and cause delays. A series of simple tests believed to serve for most ordinary applications are described briefly by Mr. Smith.

capabilities and previous training. Procedure—that is, the methods of teaching—is considered in great detail of course, but it is the *result* which is the determining factor in the choice of methods.

A great business keeps accurate records of its men. Their remuneration is based very largely on the results which these men obtain. The management knows definitely what each man has done every minute of the time that he has been working. It has an accurate measure of performance, and can tell you in great detail exactly what a certain man has done today or a year ago. The accuracy and detail of these records are remarkable.

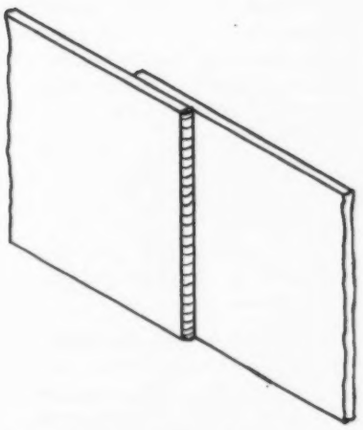


FIG. 4—This vertical lap joint is one that an inexperienced welder frequently fails to pass.

I would call your attention to the fact that in both of these cases the examinations are qualified in such a way that the output meets the design requirements.

Fit the Tools to the Job

Insofar as welding is concerned, this might lead us to the classification of operators; in fact, it very definitely does lead us to the classification of operators. Therefore, isn't it just as logical to classify jobs? Babe Ruth wouldn't be used in the Bush League, for very obvious reasons, but we are perfectly willing to put a high grade operator on a job which does not require that class of work. In other words, we should fit the tools to the job. Use the proper tools for the job to give results which meet the design requirements, but not beyond that.

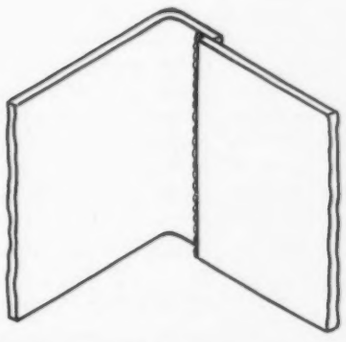


FIG. 5—Making a vertical joint in a corner, one of the most difficult tests, is typical of many field conditions.

In a good many cases Class I welding is *requested* when Class I welding is not required. It is obvious that a Class I weld may be called for more than some other classification because of the desire to have "the best there is," and without considering the service involved. For a pressure vessel, designed for several hundred pounds per square inch pressure, the best is none too good, but it would be silly to require that same class of work with all the restrictions and limitations, stress qualifications, etc., on say, air ducts in a hot air heating system. The welder should be qualified, or perhaps we might say classified. There are a large number of methods of doing this, but in too many cases the methods merely qualify the electrode.

The modern shielded arc electrode gives deposited metal of 65,000 lb. per sq. in. ultimate, elongation of 20 per cent in 2 in. or better, high fatigue values, high shock resistance and resistance to corrosion. Some welders with very little experience may be able, therefore, to deposit very excellent *weld metal*. On the other hand, the quality of *joints* which they make may be anything but excellent.

Qualification should therefore be on the joint. (It is to be noted

that proper procedure must precede the application of the weld metal to the joint so that we are assured that the weld metal has the correct characteristics.)

Tests Can Be Simple

A simple test such as a lap weld will reveal a great deal about an operator. (See Fig. 1.) The weld metal may be perfectly satisfactory but the operator may fail to put the weld metal down in the corner. He may roll it up against the edge of the plate. Perhaps there won't be enough fusion. After the joint is made it can be broken apart with a chisel and examined. The writer's personal experience is that this is the first test an operator should be given, and if he fails to pass this he is disqualified. If he does pass it the qualification tests are continued.

In addition to this, the work in the field must be considered. Merely making a good sample weld, even in all four positions—flat, vertical, overhead and horizontal—does not signify that the man is going to be satisfactory in the field. For instance, in the case of ¼-in. plate, vertical lap weld, five operators were recently taking the test and all of them did satisfactory work, some being somewhat better than others. It so happened that this vertical joint was in a corner, about ¾ in. out from the corner, so for the final qualification the lap joint was set up with a board about ¾ in. away from this joint, this board being long enough so that the operator had difficulty getting around and getting the electrode in place. The result was that only three operators were able to pass the test.

It is a matter of skill and adjustment to existing conditions as well as the actual mechanical methods of deposition of metals which is involved if we are to obtain adequate service life. There is absolutely no excuse for a poor job or poor welds with a properly trained operator. In welding the operator sees the inside of the welded joint while it is being made. It is the only process of which that is true.

The whole process is so simple that it lends itself easily to inspection and supervision. Because the operator can be seen doing the work there is a great cry from some people about the human element. The result is that there is a tendency to run wild in the specification or qualification tests, supervision, etc.

No Need for Duplication of Tests

Duplication of tests required on some jobs not only costs considerable money but causes delays. It must not be forgotten that the man making the examination or qualifying the operator should be credited with a knowledge of welding. He can judge the operator and very accurately rate him by observing him deposit weld metal.

I am thoroughly in accord with the desire and endeavor to keep the quality of welds high, but I am not in accord with some of the tests where the results are ridiculous. Chrome plating on your automobile is very satisfactory on the interior finishings of your car. Solid gold fittings would be but a display of wealth and poor sense, rather than an indication of a satisfactory engineering job.

It is just as ridiculous to require very high-grade welding on relatively low-grade work. The term "grade" is used not in reference to workmanship but in reference to the service requirements—terming a high-grade job one that involves life or property damage, and a low-grade job one where the failure would merely be a matter of inconvenience but at no particular cost.

With the control which is exercised automatically by the shielded arc electrode, with an operator who is skilled in practice under proper supervision and procedure control, *the qualifying test should be such as will qualify the operator for the particular job which he has to do*, and not impose upon the welding a cost greater than is necessary to meet the design requirements.

Make Test Low in Cost

These qualifying tests should be so simple and so low in cost as to offer no serious objection either in the matter of actual dollars and cents or delay of the job. It would seem that any good designing engineer has enough ability to know what has to be done in the field and to devise tests which will answer requirements and satisfy him that the welding is being properly done. He is willing to take tests, supervision, inspection, etc., on a good many other processes on which his knowledge of conditions existing in the finished structure are very much less than they are in a welded structure. Instead, in a good many cases there is a regular stampede for complicated, lengthy and costly qualification tests which serve no purpose other than to furnish useless information, much of which was known before the tests were started.

The qualification test should be viewed from the standpoint of service life and design requirements because the ultimate object is that of profit; and the part with the longest service life at the lowest cost is going to win out in the end. Therefore, the qualification test must be made so as to meet the service requirements adequately without undue complication and expense. In other words, fit the method to the job.

A series of test pieces such as those illustrated here serve to qualify welders for most ordinary applications.

Fig. 1, a lap weld, has already been mentioned. There should be good penetration to the root and good fusion at both sides of the bead, as shown by failure through the throat when broken.

The second test piece (Fig. 2) is a fillet weld. This should be judged on the basis of absence of undercutting, shape of the bead, lack of overlap and good fusion, as shown by fracture or bending of the piece.

Fig. 3 illustrates the third test piece—a butt weld made in horizontal position. The weld should have good fusion without overlapping or undercutting.

Another revealing test is that of the usual vertical lap joint, Fig. 4. The inexperienced welder frequently falls down on this one.

The most difficult tests of the lot should be given last. A suggestion for one of these is shown in Fig. 5. This is a vertical joint in a corner. It is typical of many actual conditions found in the field.

None of the test joints illustrated here is essentially difficult. But to an examiner who knows welding these simple tests will tell just about all that is necessary to judge the qualifications of the welder.

Dry Dedusting of Blast Furnace Gas

By A. I. VERHOTUROV
Charkov, U. S. S. R.

IN a modern steel plant there are a number of important by-products, each of which should be used to the best advantage of the plant. One of the major by-products is the gas produced by blast furnaces. Such a furnace producing 1000 tons of pig iron each 24 hours furnishes gas at the rate of approximately 2500 cubic meters per minute, thereby making available considerable valuable fuel for gas engines or for metallurgical purposes.

Gas leaving the blast furnace contains a large amount of heavy particles of iron-oxide, coke, etc. Its cleaning is accomplished in one or two principal stages depending on the ultimate use of the gas. These stages consist of a primary cleaning and a final cleaning. In the primary cleaning the gas is sufficiently cleaned for economical use in heating hot blast stoves, metallurgical furnaces and boilers. For this purpose the dust content of the gas, after cleaning, does not exceed 0.3 gm. per cubic meter. In final cleaning, the gas is sufficiently cleaned for use in gas engines, and in this case the best practice has resulted when the dust content of the gas, after cleaning, does not exceed 0.018 gm. per cubic meter.

This article concerns itself only with primary cleaning, which is accomplished at the present time in Russia by means of dry or wet cleaning systems.

THIS is the first complete description of a dry dedusting appliance which is being used with considerable success in Russia. The dusty blast furnace gas passes through a vertical rotating cylinder, of which the wall is a grid. Vanes within the cylinder impart a suitable movement to the gas, so that the dust is expelled through the grid while the gas passes out at the top end of the cylinder. The dust collects in a surrounding casing and falls to the bottom, whence it is removed through a "lock chamber."

The basic principle of dry cleaning systems depends upon the separation of dust by gravity (settling chambers), centrifugal force (cyclones) or an electric field acting on charged particles (electric precipitators). It is very difficult to clean the gas satisfactorily when gravity acceleration is used, as the velocity of the settling dust is very small. The rate of settling of particles of various sizes under gravity can be determined from Stokes' law; the frictional resistance encountered by a particle as given by this law is $F = 6\pi nrv$, where F is the frictional resistance in dynes, n is the viscosity of the gas in c.g.s. units, r is the radius of particles in centimeters, and v is the velocity of particles in centimeters per second. This is equation (1).

The particles are assumed to have a spherical shape. If the shape of some particles vary widely from the spherical, they can be replaced theoretically by spherical particles of such size that they fall at the same rate and, if necessary, the factor to be applied may be determined by experiment.

The mass of the spherical particle is given by

(2) $$m = 4/3\pi r^3 w$$

when m equals the mass of a particle in grams, and w is the density of particles in gm. per cu. cm. Since the particle experiences a buoyancy equal to the weight of displaced gas, its effective weight is

(3) $$q = 4/3\pi r^3(w-w')g$$

where q is the effective weight in dynes, w equals the density of the gas in gm. per cu. cm., and g is the acceleration of gravity which equal 981 cm. per sec. per sec.

A particle falls at such a velocity through the gas that the frictional resistance it experiences neu-

tralizes its effective weight. The final velocity can be obtained from equations (1) and (3), and is found to be

$$(4) \qquad v = \frac{2r^2}{9}\left(\frac{w-w'}{n}\right)g$$

Equation (4) then shows that the velocity at which small particles fall in a settling chamber varies directly as the square of the radius and the density of the particle, and inversely as the viscosity of the gas. Table 1 gives the rate of fall of spherical particles, of density equal 2 gm. per cu. cm., through blast furnace gas at 170 deg. C.

TABLE I

Rate of Fall of Spherical Particles of Density = 2 gm. per cu. cm. at 170 deg. C.

Diameter of Particles in Microns	Rate of Fall in cm. per min.
100	2970
50	743
40	476
10	29.7
5	7.43
1	0.297

An inspection of Table 1 would seem to indicate that it might be economically feasible to withdraw from blast furnace gas all the particles of about 40 microns diameter. In case a separation of smaller particles is desired the dimensions of the catcher must be considerably larger. Also, a number of factors, which cannot readily be included in a simple mathematical analysis, account for the poor results actually achieved in large settling chambers, as compared to the results anticipated from an application of simplified theory as shown here.

With large bodies of gases it is practically impossible to obtain rectilinear stream-line flow. This is especially the case when the gases are hot, as temperature differences will cause convection currents. These currents, and also those due to nonuniform pressure and velocity distribution throughout the cross-section of the gas stream, produce a turbulent condition which prevents the small dust particles from settling out of the gas stream.

The conditions in cyclones are more favorable for dust separating, inasmuch as the action of centrifugal force is many times greater than the action of gravity. It is convenient to measure the active force which causes suspended particles to move across the stream lines of the gas flow in terms of g, the acceleration of gravity, and to call the resulting numerical ratio the *separation factor* of the device in question.[1]

If v is the velocity in the vortex of a cyclone in cm. per sec., and R the radius of vortex in cm., then the radial acceleration in the vortex is $\frac{V^2}{R}$, which gives a separation factor of $\frac{V^2}{Rg}$. The separation factors in some types of cyclones can attain a considerable value.

New Device is Proposed

It is obvious that in cyclones the force which tends to separate the suspended particles out from the gas flow varies directly as the square of the tangential velocity of the gas in the device.

[1] Marcel A. Lissmann, An Analysis of Mechanical Methods of Dust Collection, Chemical and Metallurgical Engineering, October, 1930, pp. 630-634.

A new type apparatus for dust separation which has been proposed by the author, and is described here, is designed with a view to raise the percentage of dust removed out of a gas flow by increasing the separation factor of the device. Following is a detailed description of the apparatus, a sketch of which is shown in the accompanying figure.

The barrel (1) revolves in bearings (2) and (3) fitted with stuffing boxes. The barrel is driven through the bevel gear (4) by a motor installed outside. The barrel (1) is provided with vanes (5). The form of these vanes is determined in accordance with the trajectory of travel of the finest particles in the given gas under the action of centrifugal force applied to the particle as the barrel revolves. The vanes (5) are covered outside with wire-netting (6). To the same vanes (5), outside the wire netting (6) which must conform closely to a cylindrical shape, are fastened annular horizontal steel disks (7). Between these disks there are inserted the concentric inclined walls (8), which are affixed by means of angle bars to the outer casing (9).

The apparatus operates in the following way. Dirty gas from the dry dust catcher enters the apparatus through the flue (10) into the chamber (11) and then flows upward into the rotating annular space between vanes (5) in the form of separate prismatic columns of constant section. In order to enable the gas to enter the rotating annular space without impact there are the blades (12) beneath the annular space (5). The form of these blades is so designed that no impact occurs when gas enters the annular space (5). The gas flow is then divided into separate comparatively narrow prisms, confined from one side with barrel (1), from two opposite sides with vanes (5), and from the outside with the wire-netting (6). Every such part of gas column flows up at a definite rate towards the outlet (13), and is given a rotary motion while ascending through the annular space between the barrel (1) and outer wall of casing (9).

Thus, according to the law of centrifugal force the suspended dust particles are forced outward by radial acceleration and thrown out of the gas flow through the wire-netting (6). Apparently the most large and heavy particles become separated immediately in the lower part of the device while the fine particles pass higher and are gradually thrown out of the gas flow in the upper parts of the apparatus.

To create a zone of quiescence for free settling of the dust which has passed through the wire-netting is the purpose of the annular disks (7) and the rings (8), which are fastened to the shell. Between each of the rings (8) and corresponding disks (F) there is a gap

TABLE II

Range of Size of Dust Particles in Microns

Characteristics of the Dust Particles	Where the Samples Were Taken: Dry Dust Catcher	Before Tower Washer	After Tower Washer and Disintegrators
Large particles	210	43.5	43.5
Greatest quantity of particles	65	14.5	14.5
Fine particles	20	...	4.5

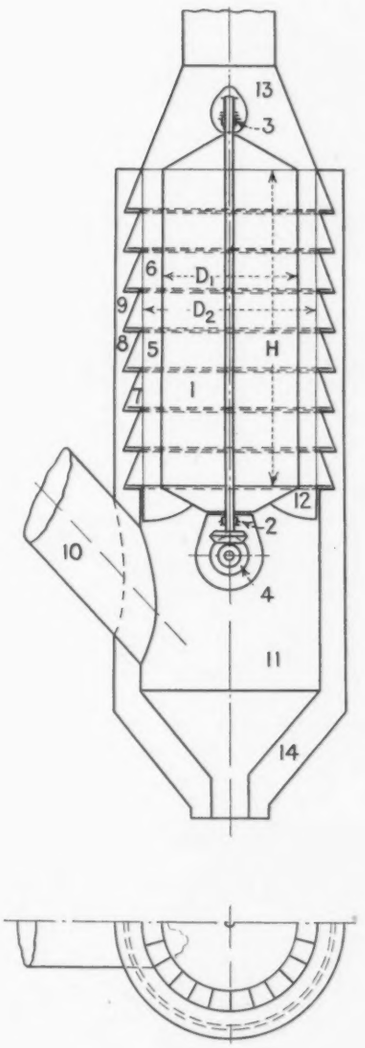
some millimeters wide. The rings (8) protect the space confined between them and the shell (9) from eddies and turbulence which are created by the rotating barrel (1). This annular outer space forms a so-called zone of quiescence. Dust particles passing through the wire-netting into the space between two neighboring disks enter the triangular chamber confined on one side with the wire netting of the revolving barrel and on the second side by the ring (8) and on the third one by the disk (7). The gas contained in this ring space is, in the proximity of wire-netting, rotating at the velocity of the netting. Near the ring (8) the gas is rotating somewhat slower. Dust particles passing through the wire-netting into this annular space whirl together with the gas confined there and are forced gradually towards the wall of ring (8). As the surface of this ring is inclined, the dust particles slide downward until they touch the revolving disk (7) by which they are thrown out through the slit between disk (7) and ring (8) into the zone of quiescence, where they settle down and travel into the dust receiver (14). This receiver, and dust bin (11), can be supplied with automatic valves which discharge the dry dust regularly into hopper cars.

Size of Particles Determined

For a calibration of this apparatus, it was necessary to define the sizes of dust particles to be removed from the gas. In order to determine the range of size of the suspended particles encountered in the blast furnace gas, an investigation of flue dust was made at one of the iron works. The samples were taken from the dust catcher, from dust pockets of the gas main before the tower washer, and from a sample of sludge after the tower washer and disintegrators. The size of particles from each of these locations is given in Table II.

For gases containing up to 30 gm. of dust per cu. meter, the quantity of dust separated in different points was as follows:

	Gm.		Per Cent
Dry dust catcher.....	18.00	=	60.00
Gas main.....	6.00	=	20.00
Tower washer and disintegrators	5.98	=	19.93
Total	29.98		99.93
Dust remaining in cleaned gas.....	0.02		0.07



CROSS-SECTIONAL view of the centrifugal machine used in Russia for dry cleaning of blast furnace gas. The barrel (1) revolves and separates the dust particles from the gas. These particles are finally removed from the outlet (14).

Thus the dry dust catcher removes 60 per cent of the total dust quantity, but this amount consists mostly of coarse particles. About 40 per cent is to be separated by the cleaner described herein. The chief problem encountered by this cleaner is to remove dust particles of about 14 microns diameter. To remove the particles up to 4.5 microns diameter is the task of disintegrator. However a certain portion of these fine particles will be separated by the rotating cleaner. The apparatus has been calibrated to remove the particles 4.5 microns in diameter and 2 gm. per cu. cm. specific gravity. Thus the cleaner will remove all the particles of more than 4.5 microns diameter and not less than half of the fine particles up to 4.5 microns diameter.

In the sample taken after the tower washer and disintegrators, the quantity of such small particles was about 10 per cent. The dust content in the gas leaving the apparatus will be not more than 5.98 $\times$ 0.05 or about 0.30 gm. per cubic meter, i. e., this gas can be used successfully for burning under boilers, for heating metallurgical furnaces, and sometimes for hot-blast stoves.

At one of the iron works in the U. S. S. R. there is to be built a cleaner of this type as a test unit for a blast furnace producing 200 tons of iron per day.

Test Unit to Be Built

The principal dimensions of the projected apparatus follow:

Barrel diameter = D_1 = 3500 mm.
Diameter of wire-netting cylinder = D_2 = 4500 mm.
Average diameter of Annular Space = D_{av} = 4000 mm.
The Width of Annular Space Between Barrel and Wire Netting = $\frac{D_2 - D_1}{2}$ = 500 mm.
Height of Barrel = H = 8000 mm.

According to metallurgical calculations the quantity of gas to be handled is 11.4 cubic meters per sec. at 0 deg. C.

Analysis of gas is as follows:

	Per Cent
CO_2	12.4
CO	25.9
N_2	53.6
H_2	2.6
CH_4	0.5
H_2O	5.0
Total	100.0

The calorific power of the gas is Q = 935 calories per cubic meter. The value of the centrifugal force acting on the suspended dust par-

(CONTINUED ON PAGE 86)

Turret Lathe Aprons Machined Without Use of Jigs

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By G. L. KLUTER
The Warner & Swasey Co., Cleveland

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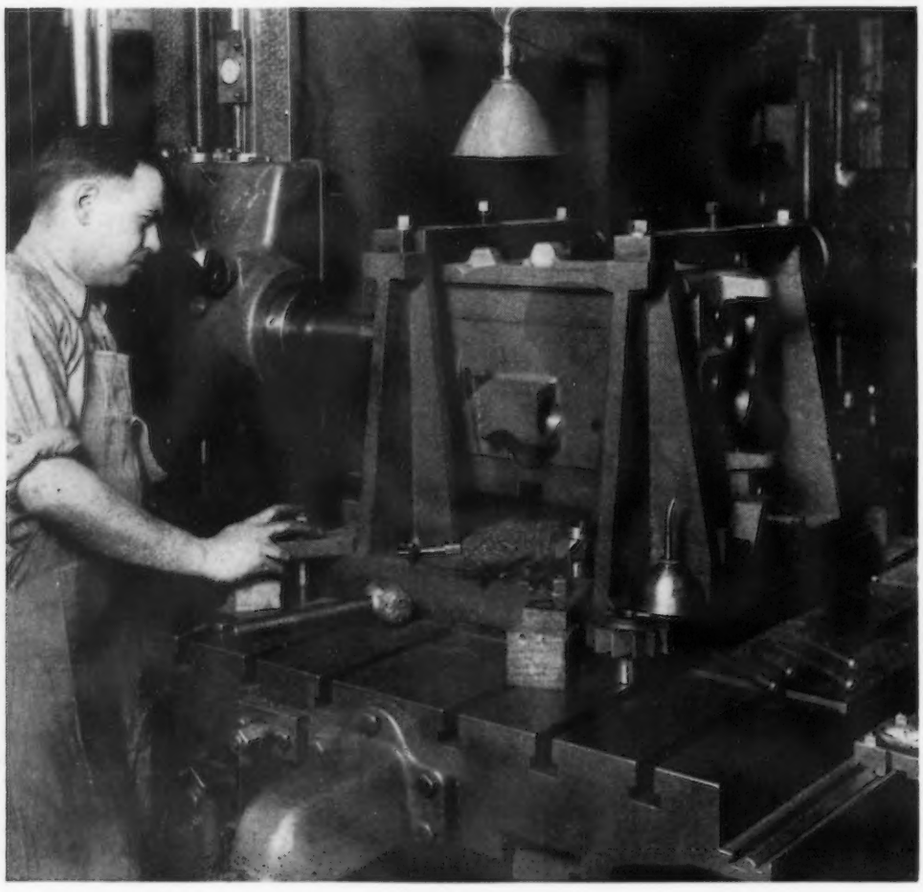
THE tooling cost of gear boxes, aprons and other large castings is a very expensive item to the machine tool builder of today. As a general rule, where two bearings in opposite walls of a housing must be in line, a line reaming fixture as well as a drill jig is required for the desired accuracy.

The wear of the bushings and line reamers is a constant source of trouble and expense, and the back-facing and counterboring operations become very complicated because of the inclosed box construction of the jig. More often the facing operations must be done by a separate handling.

This high initial tool cost and the expense of upkeep have been eliminated by the Warner & Swasey Co. through the use of the "bar gage method" of boring on a horizontal boring machine. The accuracy of this system can only be equaled by line reaming.

The accompanying illustrations show a typical set-up of a turret lathe apron being machined by this method. These aprons are produced in lots of 10 to 25, and upon completion of this operation all bearing holes in the



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THIS shows the two indicator dials, one at the lower right-hand corner on the platen for horizontal gaging and the other on the machine column at the upper left for vertical gaging. The bar gage is in place under the latter indicator. The starting block is shown at the end of the holding fixture and some of the bar gages directly beneath on the platen. The simplicity of the holding fixture is indicated by this picture.

four sides are to size and in line and the center distance accurate within one-thousandth of an inch. All the tapping, counterboring and inside facing are also completed during the operation.

The boring machine, as seen in the illustrations, is equipped with 0.0005-in. indicators and bar gage troughs, one for the horizontal movement of the platen and the other for the vertical movement of the spindle. Only one adjustable indicator bracket is required for the vertical movements of the spindle, while two such brackets with a stationary stop between them are necessary for the forward and the backward movements of the platen. These brackets are adjustable by sliding them in T-slots and locking them with a T-slot bolt and nut. This type of measuring device has no connection with the traversing screws of the platen or the spindle head; therefore, errors in screws, or backlash, do not affect the accuracy in locating. All settings are made by direct indicator readings.

The holding fixture is of simple, open construction with hardened and ground locating surfaces and the necessary clamps and screws to locate and hold the work. A hardened and ground starting block is screwed and doweled to the fixture to set the spindle at the starting position for both vertical and horizontal movements. One of these blocks is required on each side of the fixture from which a set-up is to be made.

When the hole to be machined is cored, the roughing tools used consist of standard commercial, adjustable, multiple-blade boring heads, or standard core drills for the smaller sizes. The solid holes are roughed out with standard twist drills.

All boring is done with free end single-point boring bars with two adjustable square or round bits, the first bit passing through the work before the finisher starts. In the case where the tandem boring bar cannot be used, two single bars, one set for roughing and one for finishing, are employed. A set of these bars is furnished for each

APPLICATION of the "bar gage method" in the manufacture of turret lathe aprons, which are produced in lots of 10 to 25, has reduced tooling costs while maintaining accuracy equal to that of line reaming. Procedure in using this method of boring is outlined by Mr. Kluter.

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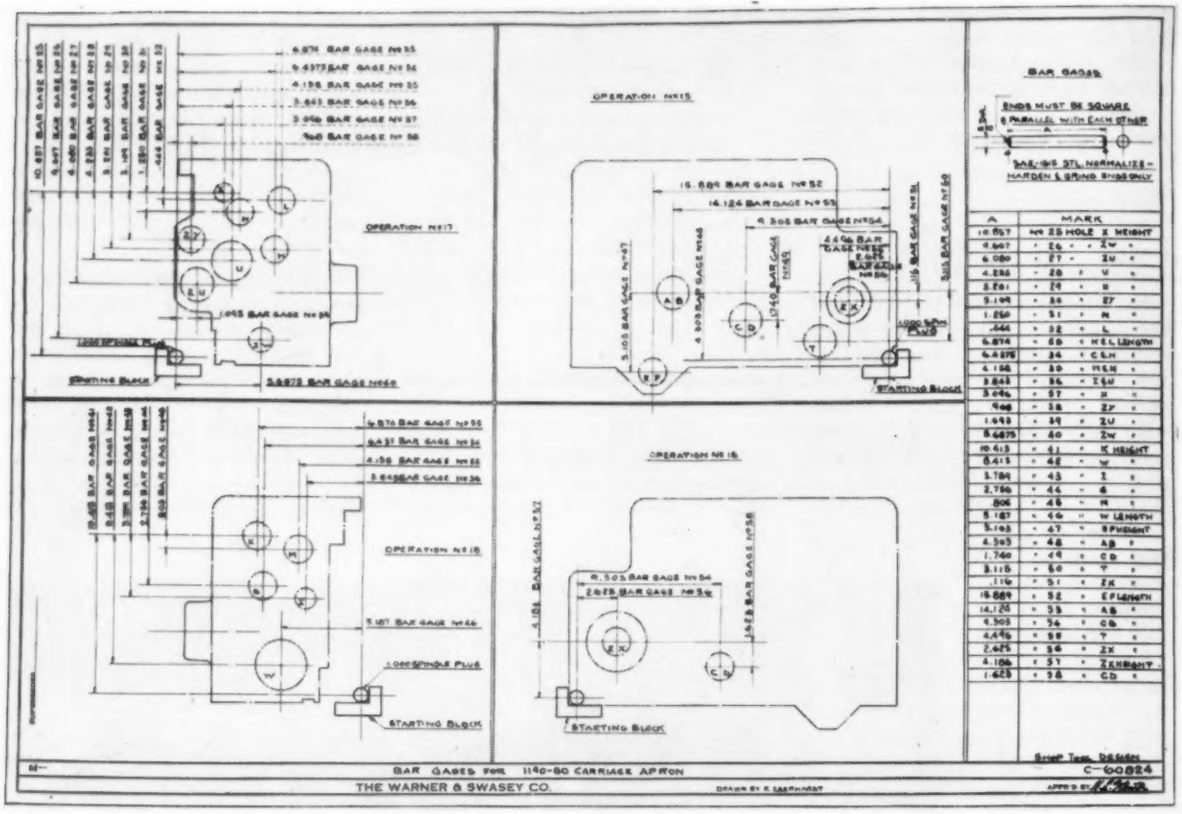
ANOTHER view of the holding fixture, showing the boring cutter in the hole. The starting block is shown at the bottom of the fixture.


OPERATION No 17
OPERATION No 15
OPERATION No 18
OPERATION No 16
STARTING BLOCK
BAR GAGES
ENDS MUST BE SQUARE & PARALLEL WITH EACH OTHER
SAE-1045 STL. NORMALIZE - HARDEN & GRIND ENDS ONLY
BAR GAGES FOR 1140-50 CARRIAGE APRON
THE WARNER & SWASEY CO.
C-60824

SET-UP chart showing starting position of piece and all vertical and horizontal center distances together with bar gage numbers for machining each end and each side of a turret lathe apron.

size hole to be bored, and the size of hole is stamped on the bar.

All reaming is done with standard expansion reamers which can be adjusted by the operator to suit the necessary plug gage tolerances.

The facing operations can usually be accomplished with standard bayonet, lock-type, right and left-hand facing cutters, the facing bars being piloted in the reamed holes. All tapping is done in the usual manner.

A set-up chart such as pictured in the third illustration is furnished the operator by the tool design department. This chart shows the starting position and all vertical and horizontal settings for the holes to be machined. In addition, all holes on the work blueprint are lettered to avoid confusion and these letters also appear on the set-up chart.

When using the "bar gage method" of boring the procedure is as follows:

The work is properly located and clamped in the fixture. An adjustable spindle plug 1 in. in diameter is then inserted in the taper hole of the spindle. This plug is trued-up with an indicator to determine the exact center of rotation of the spindle. The spindle plug is then brought to rest against the vertical and horizontal surfaces of the starting block. The longest bar gage (the one for the highest hole in the set-up) is then placed in the vertical trough, the indicator bracket is clamped in place against the bar gage, and the bezel of the indicator is then turned to zero. Care should be taken so that the travel of the indicator remains within the first revolution to eliminate the counting of revolutions.

In setting the horizontal position of the platen, the indicator bracket is moved against the solid stop without any bar gage in place. The rear bracket is used when the starting block is away from the operator and the front bracket is used when the block is toward the operator. (See set-up chart.) The bracket is then locked and the bezel of the indicator is turned to zero. The machine is now set so that any pair (horizontal and vertical for the same hole) of bar gages furnished may be laid in the troughs and the indicator brought to zero, giving the exact location of the hole to be machined. At each setting, the vertical slide as well as the platen must be locked while the hole is being machined. The operator may choose for his convenience any hole he desires.

Economical for Few-Piece Jobs

The hole is then roughed with a multiple-blade boring head or twist drill 1/32 in. undersize. Two single-point boring cuts are then taken to straighten or true-up the hole, allowing 0.006 to 0.008 in. for reaming. The reamer is then inserted for final sizing and the facing and counterboring follow when required. Any other pair of bar gages may then be inserted and the same procedure followed. After one side of the work is completed on the entire lot, the fixture is indexed 180 deg. or reset for the opposite side. The fixture is indexed or reset for each side necessary to complete the operation.

This system is also very economical for one or two-piece jobs that require interchangeability for bolt holes, etc. The laying-out time and the chances for error

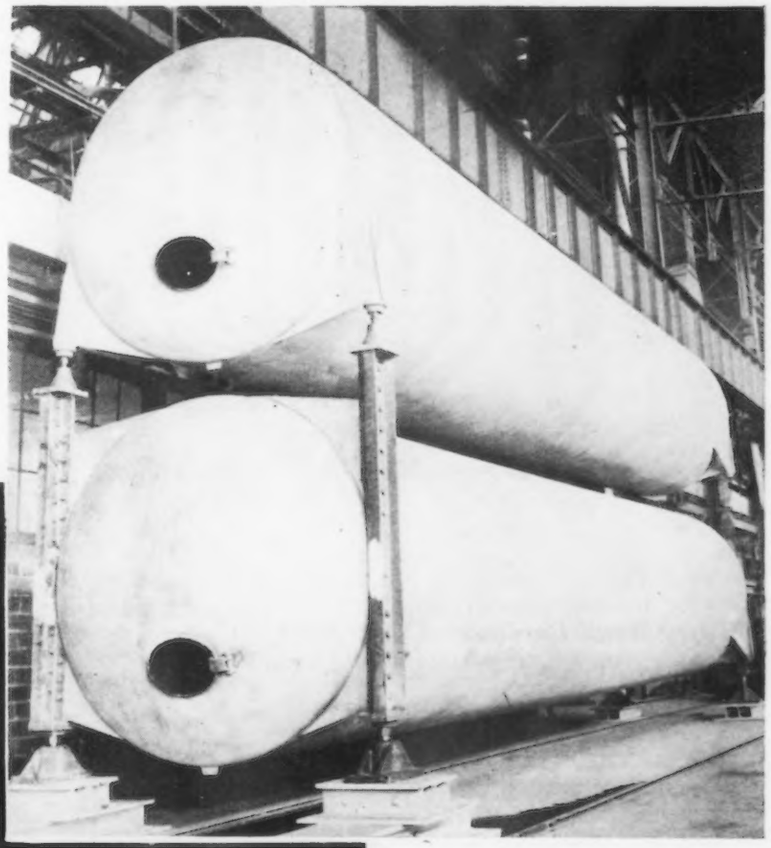
are eliminated. In a case where the bolt holes are in a circle, the blueprint of the work must have a vertical and a horizontal dimension given for each hole. The operator is furnished a standard micrometer barrel which has a 1-in. range, graduated in thousandths, and also a set of standard inch-length bar gages, which enables him to secure any given dimension.

A change in design, such as the addition of a hole or the change in size or location of a hole, means only the adding of bar gages. The cutting tools, being standard, are not affected.

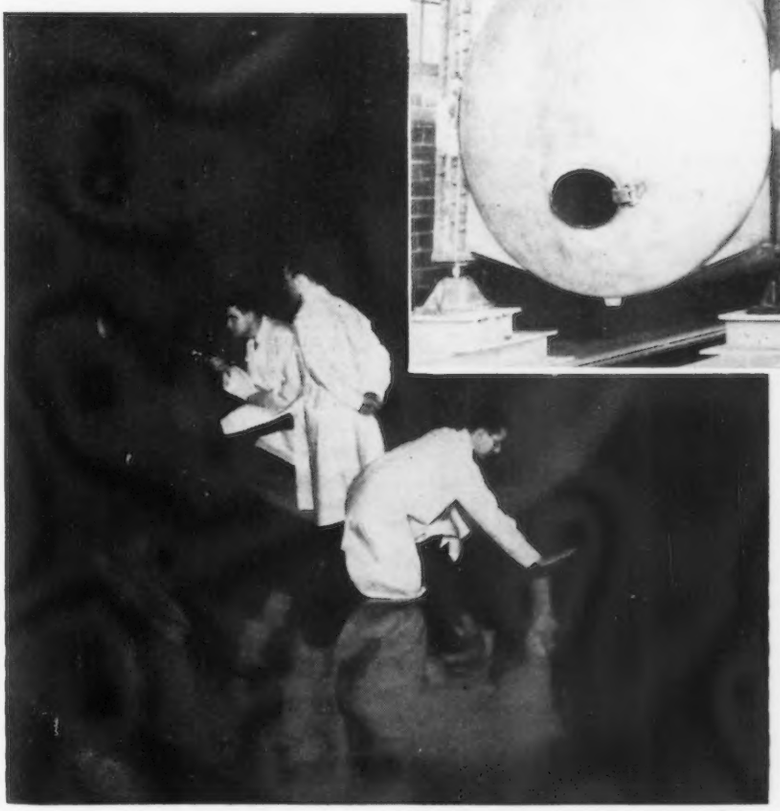
After an operator becomes accustomed to this method, the machining time (including all facing) will prove to be less than that of the box jig and line reaming method.

Jointless, Glass-Lined Brewery Tanks

SINGLE-PIECE, jointless, glass-lined tanks in sizes ranging up to 40 ft. in length and 12 ft. in diameter are being manufactured by A. O. Smith Corpn., Milwaukee. This product has particular application in the brewing industry both in the process of making beer and for government measuring tanks. This development is in part a result of successful experimentation which led to glass-coated pipe for gas lines. These tanks are of all-welded construction and being seamless they take a glass coating so that the resultant product is in fact a glass bottle with an outer shell of steel for strength.



Single-piece constructions permit simple supports and "double-decking" as a means of conserving floor space



Inspecting the glass lining in a large single-piece, jointless tank.

Glass lining is not new in the brewing industry but tanks of usual construction are built of comparatively small sections, bolted together with gaskets between sections. The single-piece tank has decided advantages in the matter of sanitation and cleanliness. Structures for supporting jointless tanks are far simpler than in the case of sectional tanks.

Late Returns from Laboratory And Mill

By T. W. LIPPERT
The Iron Age, New York

Tests Metal Corrosion in Seawater

AS part of the general corrosion program of committee B-3 of the A.S.T.M., a number of metals have been immersed in seawater to determine the effect of corrosion on their physical properties. Fig. 1 shows the first rack of specimens which has been so tested. Only preliminary data have been collected on changes of physical properties, but a full report will be presented to the society at its convention in Detroit on June 24.

A rough summary of the effect of corrosion is given in Table 1. The order of specimens in the table conforms to the left-to-right order on the rack in Fig. 1. Note that iron-chromium-nickel alloys lose exceptionally little weight because of the corrosion of seawater. Likewise the per cent losses of tensile strength and elongation are quite low. It is of interest to note, however, that aluminum bronze and copper-nickel-zinc alloys suffer comparatively little decrease in strength and elongation even though their weight losses are higher. Copper, manganese, bronze, and iron-chromium alloys display heavy weight losses and concomitant reductions in tensile strengths and elongations.

Acid Proof Enamel Used on Cast Iron

FERRAMIC, an acid proof vitreous enamel frit, is a new English product which is believed to have a large potential use for application on metals subject to the staining and corroding effects of fruit, vegetable and mineral acids. No ground coat is required. The material is available in all colors, and can be applied directly to cast iron or sheet steel. The finish is brilliant and glossy, the material contains no lead, and the cost is comparatively low. This new frit fuses at 780 deg. C., a factor of importance in connection with liability to chip. Inasmuch as the material was specifically produced to resist fruit and food acids, it is admirably suited to the coating of gas, electric and all types of cooking apparatus made from cast iron or sheet steel.

Corrosion tests have been made at temperatures up to 50 deg. C. for periods as long as six hours. The following solutions had no visible effects on the enamel: ferrous sulphate, potassium permanganate, nitric acid, tea, potassium hydroxide, sodium hydroxide, tannic acid, sulphuric acid, glacial acetic acid, oxalic acid, hydrochloric acid, and others.

Resin Varnish Reduces Corrosion Fatigue

THE Royal Aircraft Establishment (England) has just concluded a series of experiments to

determine the influence of coatings on duralumin with respect to its corrosion fatigue. The rotating cantilever endurance tests on duralumin (copper 4.2, manganese 0.64, magnesium 0.64, iron 0.83, and silicon 0.22 per cent) were conducted in air and in a salt spray, after the surfaces had been treated in various ways. In air the untreated material gave a fatigue limit of stress of + or — 9.1 tons per sq. in. at 10^7 cycles; the anodized materials gave + or — 11.1 tons per sq. in. In a salt spray, lanolin coating and cadmium plating afforded little protection, but zinc plating gave a substantial improvement in the corrosion-fatigue range. Spraying with aluminum was found not so beneficial as zinc plating at long endurance. Coatings of organic resins and enamels afforded a very high degree of protection, especially when the metal had previously been anodized; the best results were obtained with a coating of synthetic resin varnish and stoving for two hours at 150 deg. C. The metal treated in this manner gives a fatigue limit stress of + or — 12.2 tons per sq. in. at 10^7 cycles.

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FIG. 1—A. S. T. M. specimen rack as it was removed from seawater, following an immersion lasting 243 days. Several specimens on a duplicate rack corroded from the supports. The eighth specimen from the left (low carbon, Ni-Cr-Fe) and the one on the extreme right (Fe-Cr-Ni) suffered least weight loss due to corrosion. The second specimen from the right (Fe - Cr) suffered most.

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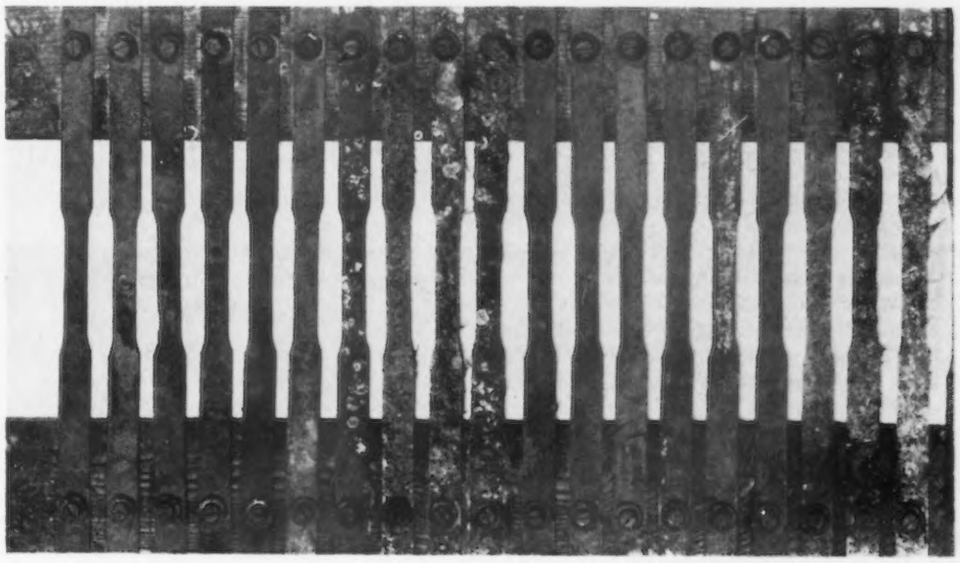


Improves Tin Plate Testing

THE relative freedom from pores has come to be recognized as one of the chief factors determining the quality of tin coatings for many industrial purposes. Within the last two years the industry has depended extensively on two methods of testing porosity, i. e., the ferricyanide-paper test in an improved form, and the hot-water test. In order that these tests may be used to the best advantage, the Tin Research Council has published information on best methods of making these tests and recent improvements in the tests.

Before applying either of these two tests it is essential to remove all greasy matter without injuring the tin coating. Cathodic degreasing is recommended. A dilute sodium carbonate solution (0.5 per cent) is employed as electrolyte, and two sheets of nickel are immersed, one on each side of the containing vessel. These nickel sheets are connected to a positive pole of a 4-volt supply of D.C. The specimen, connected electrically with the negative pole, is immersed and allowed to remain for about one minute. When gas bubbles form freely on the surface of the specimen, it is removed and washed in running water.

For surfaces having exceptionally resistant grease films, the specimen is swabbed with a carbon tetrachloride solution. A thin film of Necol varnish is then brushed on and dried, after which the varnished specimen is treated cathodically as above.

The degreased specimen is immersed in distilled water (at 95 deg. C.) for about 6 hr. During this period, reddish-brown spots having black nuclei form on the bright surface, as demonstrated in Fig. 2. These spots may be counted to show the relative porosity of various coatings.

It is essential that the containing vessel is entirely free from contamination and the water is of high purity. Ordinary soda-glass beakers should not be used as they alkalize the water.

New Alloy Removes Gases From Castings

A SODIUM zinc alloy containing 2 per cent sodium and 98 per cent zinc has been developed by the Grasselli Chemical Co., Cleveland, to expedite the elimination of oxide and gas occlusions from brass and other zinc-bearing castings. Thus the material serves to free the castings of blow holes and other defects, and the use of small additions to bronze melts is said to prove highly efficient in making high strength castings.

The alloy, in the amount of about 5 per cent of the quantity of the molten metal, is added to the bath before pouring. The effect of the alloy is to cause a violent reduction and elimination which thereby reduces the oxide bearing

(CONTINUED ON PAGE 90)

Steel Replaces Masonry For Lake Crib

STEEL has replaced granite masonry construction in a crib now being completed by the Bureau of Engineering, city of Chicago. To most people "crib" calls up a picture of an infant's bed, but to dwellers along the Great Lakes it means a structure covering the water intake where water is drawn from the lake and diverted through tunnels below the lake bottom to municipal water supply systems. The Dever crib, which was designed by the Bureau of Engineering and is expected to be put into operation July 1, is located in Lake Michigan adjacent to the Carter H. Harrison crib, an old masonry structure, about three miles northeast of the foot of Chicago Avenue, Chicago.

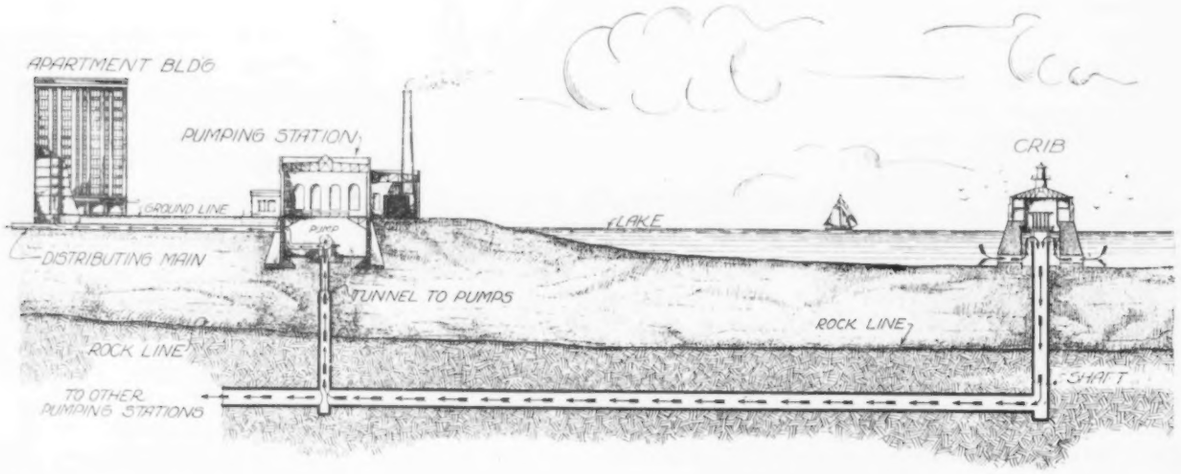
A cost comparison between the new crib and the older cribs cannot be made with any degree of exactitude. No two cribs are of the same size and construction, and dates of erection are spread over many years. Moreover, no alternate bids on a masonry type structure were taken before the contracts for the Dever crib were placed. It is believed, however, that the saving effected by constructing of steel and concrete rather than of granite was substantial.

The total quantity of steel used in the crib was 1077 tons, of which about one-quarter was in the superstructure above the water line. The substructure is 90 ft. in diameter and 46 ft. high. The shell for the structure, fabricated from steel plate by the Chicago Bridge & Iron Works, was floated out to the site, located, and lined with concrete. The superstructure is 71½ ft. in diameter and 44½ ft. high and the crib extends 52 ft. above the water line, the lake bed at this point being 34 ft. below water level.

The exterior of the superstructure, which is mainly plate work, was fabricated by the Midland Structural Steel Co., Cicero, Ill. On the outside of the plates are vertical rows of steel angles, which give the crib a modernistic effect and help take the ice thrust in winter. A girdle of sheet steel piling extends between the superstructure and the substructure above and below the water line.

The interior lining of the crib was fabricated by the New City Iron Works, Chicago, and the water screens by the Gage Structural Steel Co. of the same city.

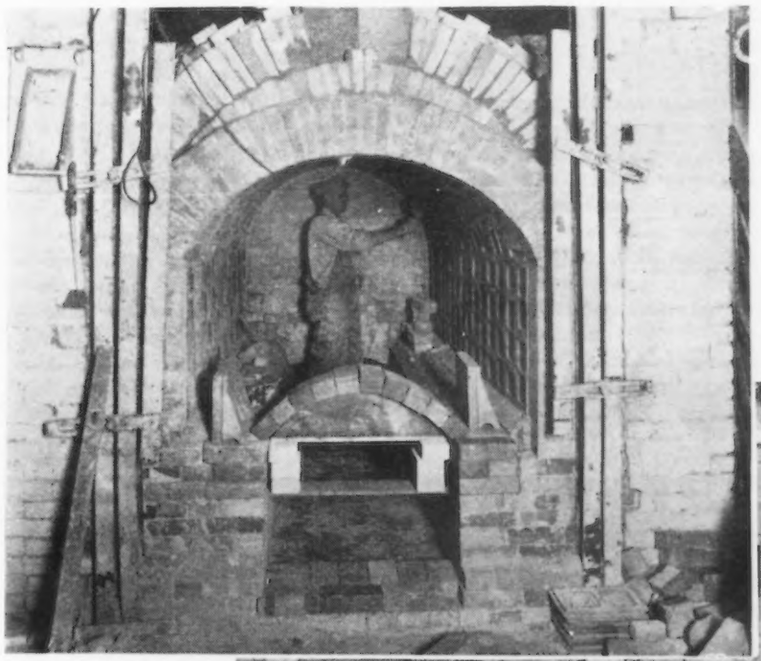
An unusual feature of the interior construction is a stainless steel ring, 39 ft. in diameter by 10 ft. high, which lines the water shaft at the water line. This steel is No. 16 gage material and totals 3700 lb. in weight.

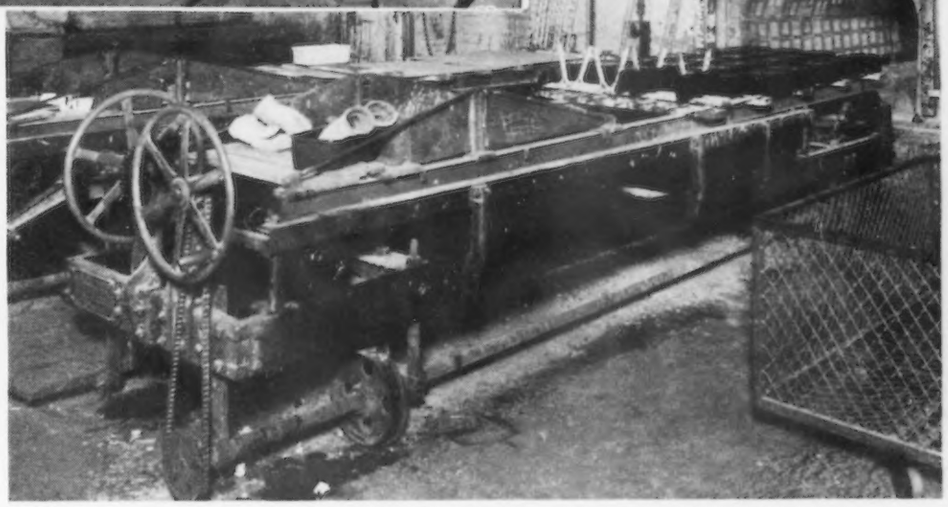


Making Porcelain Kitchen Ware

By J. B. NEALEY
American Gas Association

SHEET metal working, frit smelting, vitreous enamel making and burning the enamel onto the products formed, are four separate and distinct industries, but are sometimes combined into one. This is the case with some manufacturers of porcelain kitchen ware, of which the Strong Manufacturing Company, Sebring, Ohio, is an outstanding example.





ABOVE

GAS-FIRED enameling furnace in process of construction.

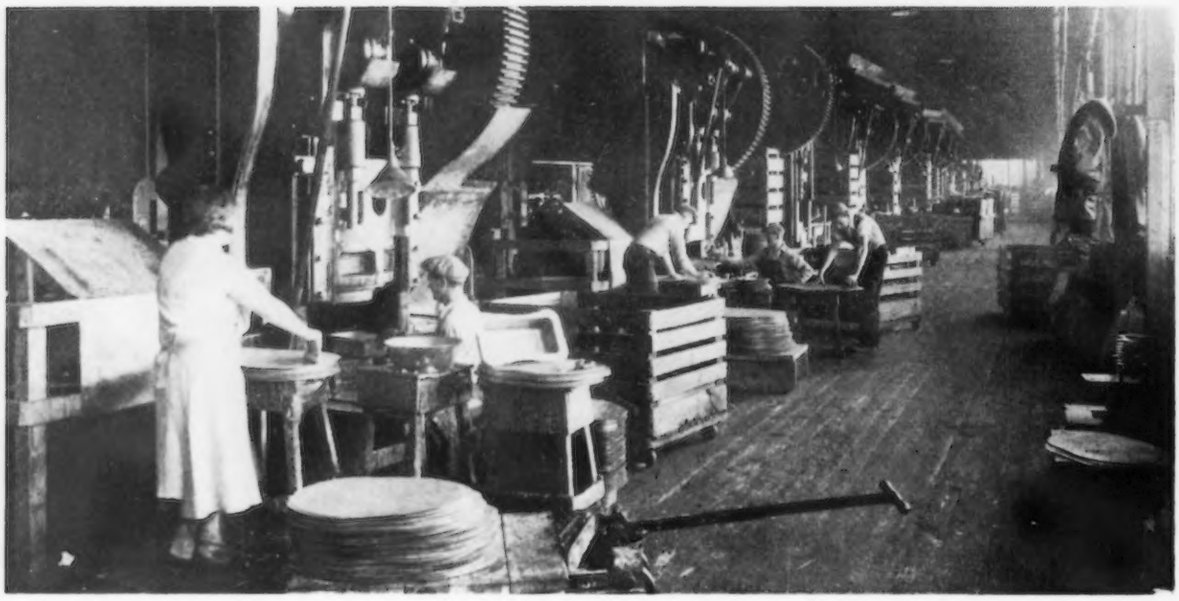
AT RIGHT

SPEED fork removing enameled work from furnace.

The raw material comes in at one end of this division, is sheared to size and is passed down the lines of presses. Most of the heavy work is done in the big presses close to the shears so that the major portion of scrap is accumulated and disposed of with the least effort. One item made here, from 20-gage steel, is a pan 16 x 20 x 6 in. deep, requiring eight operations as follows:

1. Blank
2. Draw
3. Anneal with gas burners
4. Trim
5. Bead (turn edges down)
6. Bead (turn edges under)
7. Pickle
8. Enamel

The annealing is confined to the



ROW of presses at work on pans.

corners, and for this there is an upright holding a steel plate with a gas burner on each corner. All four gas burners are furnished a mixture of gas and air through a single venturi tube. Some other products are annealed before trimming and beading.

The pickling unit consists of the usual tanks and gas-fired oven, the different items being washed, drenched in a sulphuric acid bath and then a neutralizing solution, after which they are dried. The tanks are set in a row, end to end, and the utensils are handled in steel baskets suspended from an overhead rail by hoists. The brick oven runs through a brick wall into the next division, is open at both ends and is equipped with a motor-driven, slat-type conveyor. This oven is 6 ft. square and 20 ft. long, and is heated with gas burners located below. The conveyor extends some 6 ft. beyond either end of the oven for loading and unloading.

Frit, the base for enamel, must be so compounded that the final enamel will have the same coefficient of expansion as the utensils it is to cover. This factor must hold not only while the enamel is being fused at high temperatures, but ever after when employed in the kitchen bake oven. For this reason formulas for frit are com-

SLUSHING enamel on the steel pans.

PICKLING set-up with drying ovens.

plicated and usually contain the following: borax, quartz, feldspar, soda ash, fluorspar, cryolite, sodium nitrate, zinc oxide, whiting, ammonia, nickel, cobalt, etc.

The granulated frit is shoveled into boxes and taken to the enamel room. Enamel making consists primarily of mixing with the frit correct proportions of clay, magnesia, tin oxide, colors, etc. The batch is then put into a ball mill with water and ground. All primary colors and many shades are used here. It requires several different colors to obtain the right shades, and the entire process of proportioning the various ingredients employed, always with the limiting factor of an unchangeable coefficient of expansion, involves a very nice technique. The ground product of the ball mills is the finished enamel ready for use.

The enamel is either sprayed onto the ware or is placed in tubs where the products to be finished can be slushed or dipped into it, after which they are dried in a gas oven, beaded, inspected and fused in a gas furnace. This constitutes the fourth and last process in the making of kitchen ware and the different items are carried from one operation to the other on racks with casters.

The finish consists of three coats —ground coat and two cover coats.

(CONTINUED ON PAGE 92)

OPERATORS at work beading pans.

Activities Bearing on Machine Tools Distribution

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A Department Conducted by L. M. Waite

The Open Line

IT is frequently questioned, in today's search for better ways of doing things, whether open-line selling as at present practiced, is a desirable machine tool distribution policy from angles of maker, seller or buyer. If not, can questionable angles be remedied, and by whom?

There are certain outstanding conditions in the existing open-line policy which are sufficiently productive of bad humor to warrant the best thought of those who are charged from time to time with sales policy determinations.

Modern machine tool distribution merits selling activity on a high plane, nor does experience indicate that any plan finally adopted can wisely be devoid of flexibility in so far as it involves cooperative effort within reasonable bounds.

The following comments are resultant from having watched the open-line policy from both the manufacturer and the dealer angle; from having participated in it; competed with it intimately, and from having frequently listened to bitter seller and sarcastic buyer condemnations concerning its use as a trick element in price cutting, even under code restrictions. These conditions are particularly noteworthy in cases involving prospective purchase of "lists" of tools.

It is well demonstrated that the maker who adopts open-line distribution of his machine tools must smilingly accept a considerable belittlement of his product. It is certain to be referred to frequently as "open line stuff" by sellers and purchasers alike. The competitive reaction to "open line stuff" is, to say the least, the intimation or suggestion of inherent machine qualities or organization weaknesses which have so positioned the maker that he supposedly has no other distribution course open.

It is sometimes claimed that open-line competition keeps makers on their toes. The strength of this economic claim can reasonably be questioned in the case of open-line machine tools. A low price quoted on open-line equipment is far too generally aimed at a reduction of the sum total quoted, including other equipment, rather than intended to present to the prospective purchaser a more productive equipment at an equal or lesser price. In this way the question involved becomes one of price-beating tactics.

* * *

Conflicting Lines

THERE is a large amount of lines-conflict because of too much dealer use of open lines in making secondary quotations on like-purpose equipment, when the individual dealer has a regular line which is the higher in price. A frequent cause seems to be a more or less general acceptance of sales reports covering a supposed necessity for substitute quotations. A salesman, always interested in securing an order, is prone to accept somebody's diagnosis of selection probability based upon what amount may be intimated as available in the way of purchase funds. Especially can this be expected when the salesman is dependent upon commissions with respect to at least a part of his income. Purchasers who are given to dollar squeezing conversations, whether under instructions or not, are often more at fault than salesmen. Once the die is cast a salesman may normally incline to follow the lines of least resistance. Thus neither the first nor secondary quotations are adequately represented.

It is not uncommon to find salesmen within a single dealer organization following opposite procedures; one will fight for his manufacturer's product, while the other will be less concerned with the merits of the equipment and will seemingly be satisfied if he can just "land an order." Factory bonuses are not an unknown device in combating this inner organization type of open-line competition.

* * *

The Buyer's Angle

FROM the buyer's viewpoint, many purchasing agents have taken note of the amount of time and energy wasted in the bother which is quite a regular part of price flexibility in open-line price jockeying. Many of the lags which occur in order placing are directly traceable to a habit of giving some other fellow a chance to scare up a price on like purpose open-line equipment. Very frequently the other fellow will make a second-hand equipment offering as a substitute for "open line stuff," and thereby enter another element into the order scramble.

These combinations of sales circumstances seldom deal with shop-preferred or shop-specified equipment, and generally require considerable engineering or mechanical reexamination of bids before the acceptance of any offering can be given; this frequently at real expense, although it may be difficult for the purchaser to determine the amount of this expense, should he desire to do so. A net result is that shop antagonism may be aroused for substitute machines if and when purchased. Expense and bad advertising for the maker often pile up in connection with calls for shop men or demonstrators to "straighten out" machines thus bought on price, rather than because the purchaser was really sold on the merits of the equipment.

It is suggested that master tools of industry are best sold by an orderly procedure which is in keeping with the economic worth of their design purposes.

* * *

Newly Equipped

A BROOKLYN, N. Y., manufacturer has about completed order placing for a considerable list

of modern machine tools to be used in the manufacture of steel caskets and round telephone booths, also made of steel. The greater part of the equipment consists of press brakes, shears and punch presses.

Rubber Machinery

GUY L. HAMMOND, president, Black Rock Mfg. Co., Bridgeport, Conn., reports a reasonably good volume of business during the past five months. Inquiries at present are at a high point. The company manufactures air, hydraulic and motor driven production machines for cutting rubber and other non-ferrous materials. Automobile activity has been responsible for a considerable percentage of orders. A shortage of skilled labor is serving to retard shop production of machines and equipment,

Rolling Mill Equipment

FROM heavy machinery areas reports continue as to bookings far ahead on several types of rolling mill equipment. From customer sources several orders are reported involving purchase of foreign equipment of specialized types.

Used Machines

A PROMINENT dealer who in the past has featured used tools, along with agency lines, reports the first three months of 1935 as better than the first six months of 1934, with less than 5 per cent of the 1935 business in used machines. He states that the volume of the 1934 business was not unsatisfactory.

Southern Railroad Shops

CHAS. CLEES, JR., 136 Liberty Street, New York, general representative, Golden - Anderson Valve Specialty Co., Pittsburgh, has recently completed a six weeks southern trip during which he contacted 66 operating executives of southern railways. Mr. Clees reports a tremendous amount of planning for general betterments throughout shops. Funds for purchases are not yet available but the preliminary work is finished.

Schools

PRACTICALLY all machines have been ordered on the schedules of the Brooklyn Technical High School and the Bronx Vocational High School, New York. A few items for Brooklyn are to be readvertised, it is understood. Machines for Samuel Gompers Industrial High School and Staten Island Vocational High School have not as yet been ordered although it is stated that quite a few of the equipments have received preliminary approval. Order placing on these later schedules should develop within two to three weeks.

Japan

A PROMINENT metropolitan dealer is quoting on a list of 25 standard machine tools for shipment to Japan. This dealer enjoyed a business of 19 standard machines from his Japanese connection during the past year.

Deliveries

WE are advised of July and August delivery specifications by additional machine tool manufacturers. Included are heavy boring mills.

Local Code Committee

ROBERT L. GIEBEL, 236 West Fifty-fifth Street, New York, has been appointed chairman of the local N.R.A. machine tool code committee, succeeding the late J. R. Vandyck. Mr. Giebel was associated with Mr. Vandyck for a number of years in the Vandyck Churchill Co. Other members of the committee are W. Brown, of Wilson Brown, Inc., 30 Church Street, New York, and Chas. Cameron, Graybar Building, New York. Mr. Cameron is a representative of the Monarch Machine Tool Co., Sidney, Ohio.

Sailed

ALFRED DRISSNER, vice president, National - Acme Co., Cleveland, sailed on the S. S. Hamburg, April 17. Germany, Italy and other continental countries are on Mr. Drissner's schedule.

Frederick V. Geier, president Cincinnati Milling Machine Co., sailed for Italy during the week of April 14.

New Packaging for Beer Distribution

THERE are a number of reports in circulation in reference to probable equipment of one, two or three plants throughout the country for the manufacture of metal containers to replace bottles in the distribution of beer. During the past two years there has been considerable experimentation for determining satisfactory treatment for the inside of such containers. Results are said to have warranted a try-out of this new packaging in one or two localities where consumer reaction is being studied. We learn that, in the event widespread distribution is decided upon, eight to ten months will be required to design, build and install equipment, much of which is of a special nature.

Pittsburgh

DEALERS in Pittsburgh report April business in machine tool lines as holding its own—"generally good." Inquiry indications point to a second quarter at least equaling the first. Not having a particularly diversified industry condition in connection with machine tool distribution, the Pittsburgh area reports are pleasing and indicate that the district is on its way to maintain the average of sections having wider activities. Dealers report little labor unrest in the shops which they contact.

New Pickling Plant Open at Detroit

THE Consumers Steel Products Corpn., 6450 East McNichols Road, Detroit, has completed a modern pickling plant for sheets, bars, etc., with a daily capacity of 500,000 lb., which was placed in operation April 15. This plant is an addition to the company's new warehouse.

Machinery includes six shears with a capacity of ⅜ in. in thickness and up to 156 in. in length, roller leveler, and stretcher leveler. Stock on the floor at all times consists of around 5000 tons of steel, which includes all gages and sizes in cold-rolled sheets, hot-rolled sheets, galvanized sheets, terne plate, paint strip sheets, and galvanized corrugated roofing sheets.

Will Build 72-in. Strip Mill at Gary

THE American Sheet & Tin Plate Co. will build a continuous sheet strip mill at Gary, Ind., to roll 72-in. wide strips. Contracts are being let for machinery and equipment. This improvement is part of the rehabilitation program approved by the finance committee of the United States Steel Corpn. on Jan. 29.

The 1935 edition of "Steel Methods and Materials" has just been issued by Edgar T. Ward's Sons Co., Pittsburgh, operator of steel warehouses in principal cities of the United States. The booklet contains specifications and complete description of cold-finished alloy, carbon and high manganese steel bars, coppered Bessemer steel rods and hot-rolled high carbon steel and hot-rolled alloy, high manganese mild steel bars. Standard manufacturing tolerances of cold-finished steel bars and shafting are included, as well as general information as to the grade of steel bars.

Flexibility and Accuracy Stressed in

WHEN the Youngstown Sheet & Tube Co. put its new 79-in. continuous hot strip mill into operation at its Campbell works, Youngstown, March 12, it established a record. On June 30, 1934, it was rolling steel on an old blooming mill located on the site of the new strip mill. Less than nine months later, the new mill was completed and prepared to roll steel 18 to 72 in. in width and from 19 gage to ½ in. in thickness.

This constitutes a notable building feat when it is realized that the mill, with accompanying equipment, covers seven acres and is a quarter of a mile long and that approximately 400 freight cars were needed to transport the mill machinery alone to the site.

The cold mills will be built 40 per cent heavier than any comparable existing equipment in the industry.

Will Handle Heavy Slabs

Prior to the journey through the cold mills, coiled hot strip steel will be uncoiled and put through a 300-ft. four-tank, continuous pickling machine being recoiled at the discharge end. About half of the annealing equipment being installed is of the latest box type and the other half of the recently developed radiant-tube type.

Slabs ranging from 2000 to 15,500 lb. in weight are brought up to rolling temperature prior to starting their trip through the hot mill in two slab heating furnaces, each of which is 82 ft. long and will accommodate 50 tons an hr.

These furnaces are of the triple-fired, continuous type using natural gas, coke oven gas or mixed

FINISHING Stands of the New Continuous Strip Mill of the Youngstown Sheet & Tube Co. at Campbell, Ohio. A single strip of steel may be going through all six stands at the same time.

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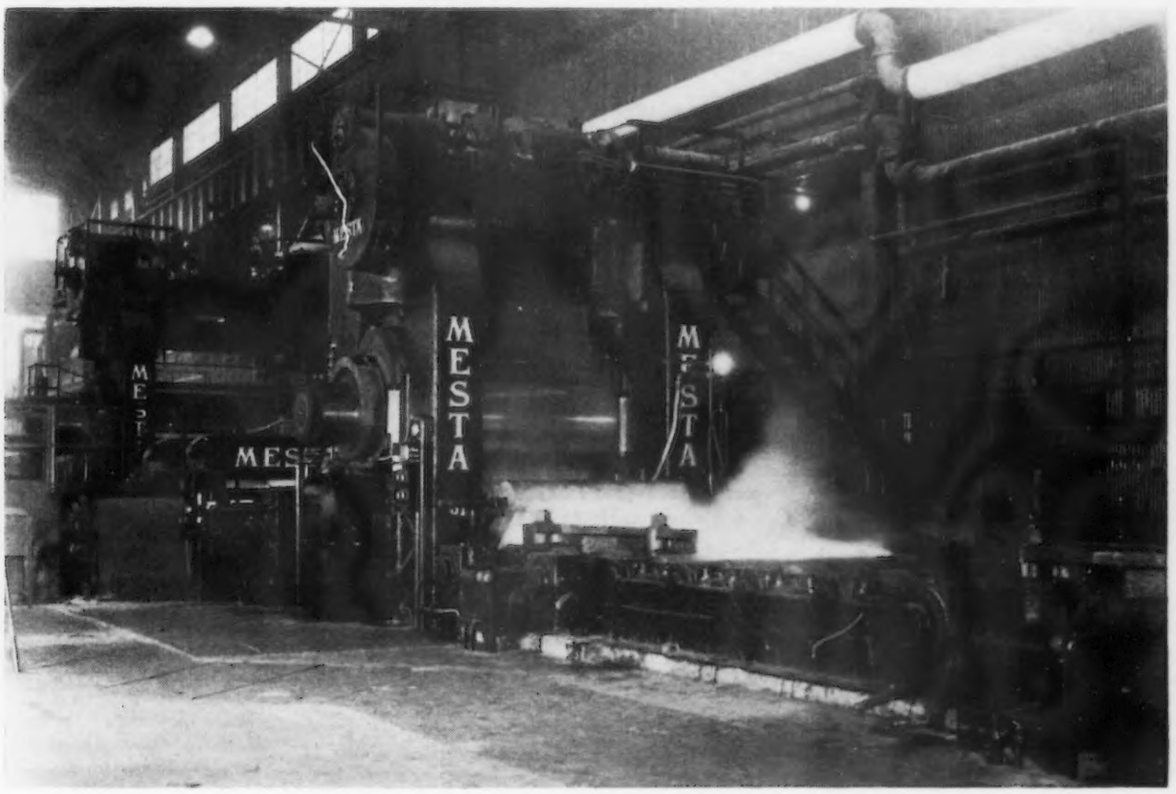
New 79-in. Continuous Strip Mill

Youngstown Sheet & Tube Unit Completed in Record Time

gas as fuel. As each cold slab is pushed in at the front end of the furnace, a hot slab is discharged at the other end, dropping onto the rolls. The slab moves along at a rate of 400 ft. a min. It first passes through a scale breaker which removes the scale due to oxidation. To wash the steel clean, water is applied to the slab at a hydraulic pressure of 1000 lb. per sq. in. at the delivery side of the scale breaker. Incidentally, this same hydraulic pressure may be applied five different times to the slab or strip on its passage through the mill, the number of applications depending on the specific product desired.

From the scale breaker, the slab moves to a turntable whic hturns it 90 deg. to spread on the first roughing mill. After passage through this stand in broadside position, the slab is returned to its original rolling direction by another turntable. The slab then travels through a squeezer and three additional roughing mills which break it down into a section approximately 1 in. thick. Speed of the table between the mills is 250 to 430 ft. per min.

The first roughing mill has rolls, the working faces of which are 96 in. long. The work rolls are 25 in. in diameter and the backing up rolls 49 in. in diameter. Stands Nos. 2, 3 and 4 are identical with No. 1 except that the working faces of the rolls are 79 in. long. Each of the four stands is driven by individual alternating current, constant speed motors, No. 1 mill is driven by a 3000-hp. motor, equipped with a 50-ton flywheel and capable of developing 10,200 potential hp. Nos. 2 and 3 mills are



THE Roughing Stands of the Youngstown Mill Are Capable of Handling Slabs Weighing from 2000 to 15,500 Lb. Scale is removed by hydraulic pressure of 1000 lb. per sq. in.

o o o

operated by 3500-hp. motors equipped with 10-ton flywheels, while No. 4 mill is driven by a 5000-hp. motor. These roughing mills are 22 ft. high overall. The work rolls weigh 22,000 lb. each and the backing up rolls 100,000 lb. each.

Steel Again Descaled

By this time the steel has again become oxidized to some extent, and the scale is removed by passage through a second scale breaker. As before, it is subjected to washing by water with a hydraulic spray under 1250 lb. pressure. The steel then moves into a series of six finishing stands. Each stand is driven by a 3500-hp., 600-volt, direct current, variable speed motor. The working face on the finishing mill rolls is 79 in. long. The work rolls are 25 in. in diameter and the backing up rolls 49 in. in diameter. A feature of the finishing mills is the fact that a single strip of steel may actually be going through the rolls of all six mills at the same time.

The speed of the mills is electrically controlled by an operator in a pulpit. Synchronized with the speed of the last finishing mill through which the strip passes at rate of 900 to 1450 ft. per min., are hot flying shears which, when required, cut the steel to the desired length. These shears, the largest ever installed in a steel mill, are driven by a 750-hp. motor.

Sufficient space is provided between mills 4 and 5 to permit controlled cooling in order to secure predetermined finishing temperatures when the strip emerges from No. 10 mill. Work rolls vary in temper from hard on the finishing end to soft on the roughing end of the mill. Backing up rolls are of the solid bearing type, the roll necks floating in a film of oil which is maintained under pressure.

As the thin ribbon of steel passes along the runout table, it may be wound on a coiler and sent to the cold mill for further processing; it may be piled down hot and be annealed or it may be piled in cut lengths at the end of the table at a somewhat lower temperature. Heavy sections may be transferred to a second runout table to be hot roller-leveled, sheared or T-sheared to specified lengths, retransferred to the first conveyor line, carried in the opposite direction and piled at a temperature cool enough to be handled.

Flexibility, accuracy and quality of product are outstanding characteristics of the new hot mill. A broad range is available with respect to analysis, physical properties and finish. The latter is assured by the close control of the rolling process and the cleaning methods. The mill is equipped with the most modern instruments for complete metallurgical control of the strip while being processed.

The mill building proper is 84 x 630 ft. and the runout building 87 x 750 ft. In addition, there is a finishing building 80 x 586 ft. and a motor room 54 x 440 ft. Next to the mill building is a slab yard 55 x 680 ft. in which slabs of varying thicknesses and sizes are stored ready to be fed into the heating furnaces.

On the wall on one side of the mill is a 30,000-gal. water tank. The mill may use as much as 20,000,000 gal. of water in 24 hr. At another point, from an upper side wall of the mill hangs a roll changing boom weighing 30 tons and capable of lifting 60 tons at a time.

In the motor room is located a series of motors and motor generators which can supply as high as 45,000 hp., as well as the auxiliary equipment needed to synchronize the generators with the motors and to adjust motor speeds to the requirements of the mills. This room is immaculately clean since it is kept under air pressure. Air is pumped in from the outside, filtered through oil filters and conducted through a tunnel into a pressure room from which vents lead it into the motor room. As the room is under pressure, this air must constantly escape outward.

Old Employees Trained for New Mill

When it started the new hot mill the company adopted a policy of giving work to men who previously had been in its employ and training them in their new duties rather than going outside for experienced help. The only exception was made in the case of a mere handful of key men who could guide initial operations.

The hot mill equipment was supplied by the Mesta Machine Co., Pittsburgh; the electric motors and generators for roughing mills by the General Electric Co., Schenectady, N. Y., and for the finishing mills by the Westinghouse Electric & Mfg. Co., East Pittsburgh, and the slab heating furnaces by the Surface Combustion Corpn., Toledo, Ohio.

Hot Mill Includes 10 Stands

The new hot mill consists of slab heating furnaces, scale breaker, four 4-high roughing mills, a second scale breaker, six 4-high finishing mills, hot flying shears and runout and auxiliary equipment. The mill's capacity is 60,000 tons a month.

Cold-finishing mills still under construction will not be ready for production until June. They will comprise three 79-in., 4-high mills in tandem, one 93-in., 4-high mill for temper passing, one 76-in., 4-high mill for temper passing and one 54-in., 2-high mill for temper passing. The 76-in. and 54-in. mills will take either coiled material or individual sheets. The 93-in. mill may roll sheets up to 90 in. in width for use by the automobile industry which is constanty seeking wider sheets. A cross rolling process will be employed on this mill, the width of the hot strip becoming the length of the cold strip.

To Discuss Blast Furnace Progress

"THE History and the Present Development of the Blast Furnace in Pennsylvania" will be the subject of the second annual metallurgical conference sponsored by the division of mineral industries of Pennsylvania State College, at State College, Pa., May 3. Among the speakers will be: Maj. Hugh L. Curtin, for many years head of the Curtin Forge and the Eagle Iron Works, Curtin, Pa.; Arthur G. McKee, president, Arthur G. McKee & Co., Cleveland, blast furnace and steel mill engineers; Ralph H. Sweetser, consulting metallurgical engineer, New York, and R. A. Field, superintendent of blast furnaces, Jones & Laughlin Steel Corpn., Aliquippa, Pa.

Leading manufacturers of air conditioning equipment who compose the membership of the Air Conditioning Manufacturers' Association (formerly Unit Air Conditioner Manufacturers' Association) will move their association headquarters to Washington. Offices have been opened in the Southern Building and William B. Henderson will serve as executive secretary.

Social Security Won't Be Obtained With a Steam Roller

By G. L. LACHER
Managing Editor, The Iron Age

THE "Social Security" bill has been passed by the House of Representatives by a vote of 372 to 33. It provides for taxes on industrial employers and employees to provide funds for old age pensions and unemployment compensation. In addition, the measure calls for Federal grants in aid to States for immediate old age relief, for maternal and child care, for vocational rehabilitation of incapacitated workers and for public health.

The pension system is to be nationally administered but unemployment compensation is to be provided for by State legislation subject to standards fixed in the bill.

To finance the pension plan Federal taxes are to be levied effective January, 1937. The employer is to pay 1 per cent of his total payrolls and the employee 1 per cent of his income the first three years, and this is to be increased one-half of 1 per cent during each succeeding three-year period until a maximum of 3 per cent each is reached in 1949.

To provide funds for unemployment compensation a Federal tax of 1 per cent on total industrial payrolls is to go into effect in January, 1936. This is to be increased to 2 per cent for the calendar year 1937 and to 3 per cent after Dec. 31, 1937. States are to have a claim on 90 per cent of the taxes collected if their unemployment reserve laws meet standards set by the Federal Government. It is left to the States to decide whether workers should bear a part of the tax by a deduction from their earnings.

A Promise for the Future, Not for the Present

The passage of the bill by the House is hailed as a great victory in the "liberal" press. The New York *World Telegram*, in urging speedy enactment of the measure, states that "the United States is 50 years behind some European countries in establishing a social security system."

Everyone who has lived through this depression recognizes the need for greater social security. All would share the enthusiasm of the *World Telegram* if they were certain that the House bill would satisfy that need. It is possible that the old-age pension plan, as set forth in the measure, has been worked out on an actuarial basis. That is a question for experts in the field of vital statistics to answer. If technical miscalculations have been made, now is the time to correct them, since neither the old age annuity nor the unemployment compensation provisions of the bill are of an emergency character. Neither would be of any value in ameliorating current depression conditions. They constitute a promise for the future rather than for the present.

The Real Basis of Social Security

Yet the pressure that has been put behind the Social Security bill has given the public the false impression that immediate enactment is imperative. Enthusiastic proponents of the measure entirely overlook the fact that a hastily enacted law may produce results quite the opposite of those intended.

Fundamentally, social security depends on the security of business and capital. Most of our present unemployment is in the capital goods industries, and it is no secret among business men, although obdurately ignored among self-appointed humanitarians, that capital won't come out of hiding until investors see a chance of a return. The taxes provided for in the Social Security bill might cause little apprehension under more normal conditions, but the prospect of their imposition at a time when the tax burden is already high and steadily mounting higher is quite another thing.

It may be pointed out that none of the taxes will go into effect until 1937 and that by that time business recovery will be achieved. It seems odd that, despite the change in administrations at Washington, there has continued to be a naive faith in the imminence of recovery. Apparently the idea has never taken root that legislation which takes recovery for granted, particularly measures involving huge new tax burdens, may be most responsible for the continued reluctance of recovery to emerge from around the corner.

Taxes and "Humane" Measures

Of course all criticism of proposed social legislation is condemned as harsh, inhumane and reactionary. But invectives do not prove a point. On the contrary, what is pilloried as inhumane may prove most humane in the long run. Taxes can be paid for only out of production. If the tax burden mounts and there is no compensatory expansion in production, there is only one possible result, and that is monetary inflation. It is always the middle class which is destroyed when currencies are destroyed.

But we are assured that "if we have recovery, the budget can be balanced." This argument is best answered by Lewis W. Douglas, former director of the United States budget in the Roosevelt administration. He points out that in 1919, when production was relatively high, when taxes were piled on taxes, when the normal tax rate was greater than the present rate, income taxes yielded $6,600,000,000, the greatest amount of revenue collected in our history. This was approximately $2,500,000,000 more than the maximum amount of reve-

(CONTINUED ON PAGE 72)

Improvements in Production

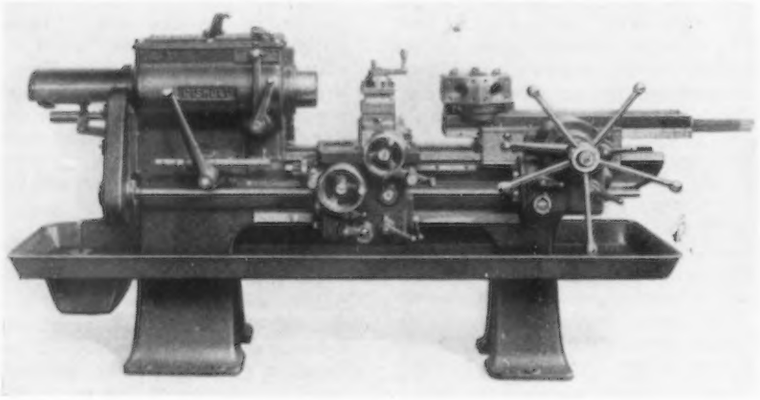
Universal Turret Lathe Employs Slide Travel in Positive Clamping

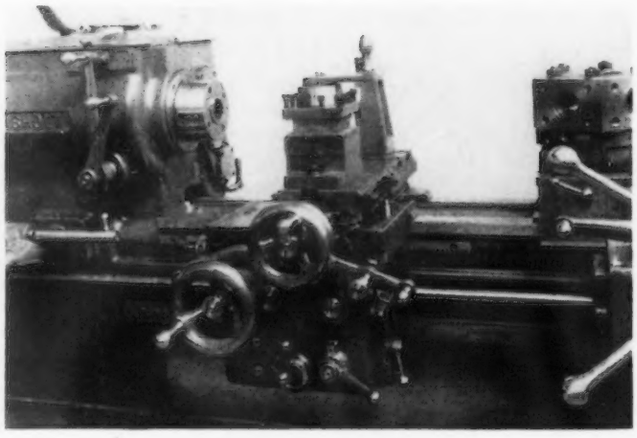
THE No. 4 universal turret lathe pictured below is built by the Gisholt Machine Co., Madison, Wis. A feature particularly stressed by the maker is the automatic operation in clamping the hexagon turret to its seat by an external clamping ring, eliminating operating attention.

The outside bevel clamping ring is automatically opened and closed by the travel of the slide. No increase in operating effort is required and the operator is spared two movements per station. Any strain is taken by the clamp ring. Hardened steel turret saddle ways, gibs and clamps are employed and automatic feed trip-screws are gib clamped. Hand-lever operation of the pump for the lubrication of turret slide movements is provided on the right of the turret carriage.

The square turret is automatically indexed, is mounted on the front of the bridge-type cross slide and is offset to reduce tool overhang. The carriage longitudinal traverse is on one-piece, hardened steel ways. An additional or lower bearing way, with gib adjustment, is located at the bottom of the bed for apron support throughout length of traverse. The front wings of the carriage pass by the bed throat. Six-station automatic feed trip is positioned on the longitudinal front of the carriage, headstock end. There are eight selective feeds in the apron. These are independent of the hexagon turret feeds and are reversible. All apron parts run in oil. A visible oil gage is positioned on the apron front. The apron is protected against possible entrance of cutting lubricant. Bed-ways and cross-slide lubrication is by hand-operated, oil-pump lever located on the lower right-hand side of the apron. The oil reservoir is in the bed leg. An auxilliary tool holder can be mounted on the rear of the cross-slide, for cut-off tools or taper attachment.

The headstock provides 12 selective spindle speeds through sliding gears and multiple-disk clutches. These speeds range from 28 to 730 r.p.m. and may be doubled. Single lever control starts, stops and reverses the spin-





THIS turret lathe carriage-apron is given support, along the arch of the bed, in its longitudinal travel movements. A third steel bed-way is provided for the purpose.

and Shop Equipment . . .

dle through multiple-disk drive clutch. Braking is applied automatically through neutral position of the control lever. A safety latch prevents accidental starting. Gears are hardened alloy steel and are mounted on splined shafts. Precision taper roller bearings are used for spindle and all drive shafts. The entire headstock has centrifugal lubrication. The drive is by V-belt from motor in the cabinet leg.

With the use of the selective gear box, each leader will cut three threads of one, two and four times its pitch. Capacity, 4 to 32 threads. The selective gear box also makes available three ranges of eight feeds from 0.001 to 0.104; 24 in all.

Automatic chuck and bar feed lever is located conveniently at the left of the operator. Automatic chuck capacity, round stock, is 1½ in. Swing capacities are as follows: over ways 18½ in., over cross-slide wings 15½ in., over cross-slide 9⅝ in. Longitudinal travel of hexagon turret 10 in., of cross-slide 19½ in. Cross-travel of cross-slide 9 13/16 in. Feeds—eight longitudinal and cross, 0.002-0.052. A 3, 5, or 7½-hp. motor is mounted in cabinet leg and drives by V-belt. Net weight 4050 lb.

New Line of Buffers

A complete line of dust-sealed, ball-bearing buffers in sizes ranging from 1/3 hp. to 5 hp. is announced by Baldor Electric Co., St. Louis. The machines are of fully inclosed construction. The wheels are carried on heavy shafts and wheel centers are well distanced. The equipment is built in both bench and pedestal types.

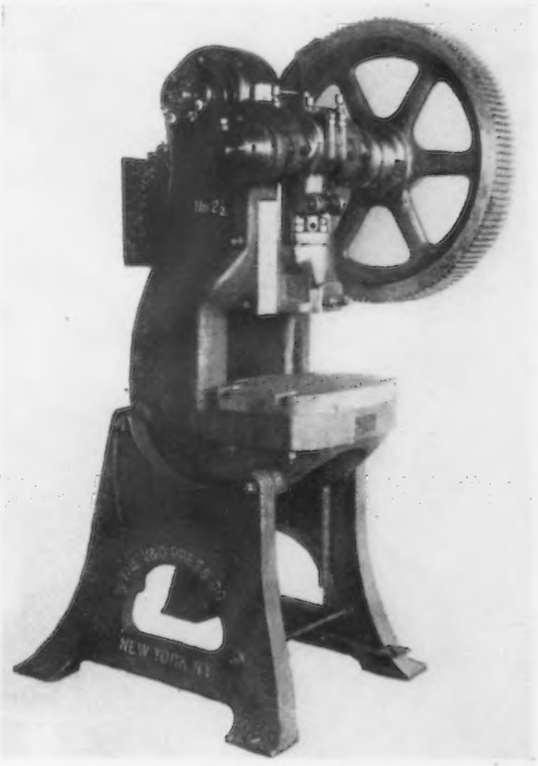
Inclinable Power Presses With Extreme Length of Slides

V & O PRESS CO., Hudson, N. Y., in its new No. 2½ geared motor drive, inclinable power press shown below, features the distribution of metal with a view to the avoidance of excessive weight. Heavy reinforcings are incorporated in a manner to give an excess of strength where needed, based upon the company's design principles, as demonstrated over a period of years.

Extreme length of slides provides stability for travel movements and serves to benefit die-life. Slide caps are adjustable and are clamped into position by studs extending from the back of the slide. All shafts are of hammered steel forgings. In all strokes within limit of clearance, eccentric type shafts are used.

A sliding clutch dog is employed. The dog engages the clutch-jaw in the flywheel hub and is withdrawn by a switch mechanism. The switch housing is adjustable to permit shaft stoppage in three different positions; top stroke or 11 deg. either back or in front of top. A positive stop feature provides against repeating.

DESIGN permits that, for use in these inclinable presses, the slide and slide bearings may approximate twice the usual length provided in some of the company's presses which do not have the inclinable feature.



in the event of brake failure; the stop recess is in the shaft. The brake or clutch block is of large diameter and provides a long bearing length for the clutch dog.

Flywheel pins are of heat-treated alloy steel and are deep seated in the flywheel hub. Each has four wearing surfaces. Clutch dog contact with the pins is with a gradual motion. The three clutch jaws are cut on the large diameter wheel-hub and are so designed that the flywheel may be used for backing the press without any additional device; the jaws are fitted with heat-treated steel backing pins.

Ball-screw type connection is employed between the pitman and slide; the screw is clamped rigidly in the pitman and a separate socket, inserted in the slide, carries the ball end. The screw has a buttress thread, so cut that the stroke impact is received on a practically square shoulder.

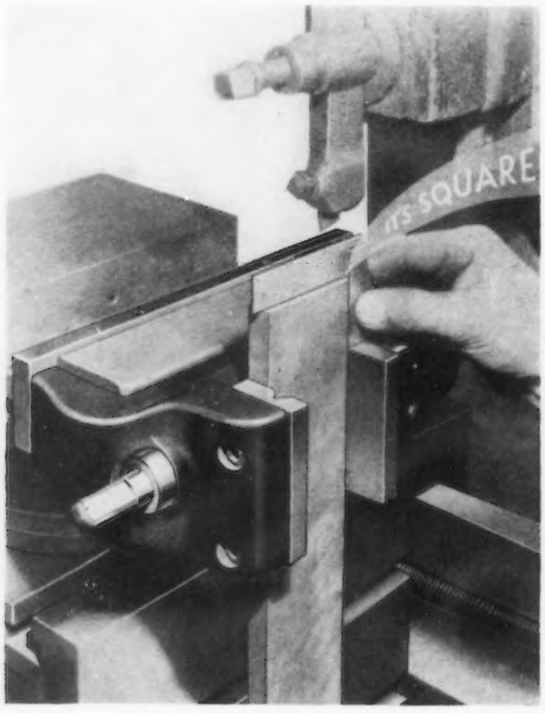
The inclining mechanism supporting-trunnions are so located on the frame that the inclining of the press does not materially change the height of the dies from the floor. Knock-outs can be furnished in slides and in bed of press.

Three drives are provided: plain or flywheel, geared, or combination geared. When combination geared, a belt rim is mounted on the main gear. Disengaging the driving pinion and putting a belt on the belt rim permits that the geared machine be operated as a plain or flywheel type machine. For high-speed operation, special equipment is necessary.

The presses can be fitted with proper dies, feeds and other mechanisms for producing parts from sheet metal, fiber, paper and other materials. Automotive, food and toy industries are among those using the machines with full automatic equipment. The bolster area is 20¼ in. x 14⅞ in. Die space 8½ in. Standard stroke 2 in. Floor space 47 in. x 37 in. Weight 2650 lb.

Shaper Vise Unit for Ordinary or End Work

A REDUCTION in the number of set-ups required and a resultant increase in the accuracy of shaper work is claimed for a shaper vise attachment and complete unit announced by the National Machine Tool Co., Racine, Wis. The equipment is illustrated below. The complete unit consists of two vises, rigidly and compactly combined. Two sets of jaws are at right angles to each other; one in a horizontal and the other in a vertical position for end shaping. Any work change to or from end shaping is accomplished without changing the position of the vise or repositioning the main table. Model C is for use with 16 to 20 in. stroke shapers. Model D is for 24-in. machines. Patents have recently been granted.



A USEFUL line of auxiliary devices is made up of an attachment and a complete vise unit, here pictured for shaper work.

Dual Tire Equipped Industrial Tractor

MERCURY MANUFACTURING CO., 4118 South Halsted Street, Chicago, announces a new type "D" gas tractor equipped with large size pneumatic tires, front and rear. Dual rear tires provide increased traction and a cushioning effect which is especially serviceable in operation over rough roadways, in yards and up grades. The equipment is pictured below. Overall length is 86 in., width 60 in., and outside turning radius 115 in.

INCREASED traction and a cushioning effect against rough-going are provided by the tractor tire equipment shown below.

Mobile Circuits for Portable Tools

SQUARE D CO., Detroit, Switch and Panel Division, has developed a system for providing mobile electric circuits for portable tools used in conveyor or assembly work. The system is illustrated below. A practically inclosed duct, containing stationary busses, provides the route over which the carriage or trolley runs. This may be selected by sections to suit requirements of the conveyor or assembly work. Feeders or subfeeders may be installed by means of special connection boxes. Five trolleys with tool units may be used in a 10-ft. duct section.

Cleaning High Finish Metal Products

PICTURED at right is equipment for cleaning metal parts, consisting of two unit members as built by the Metalwash Co., 117-119 West Twenty-fourth Street, New York.

The first member removes, by special processes, oil, grinding compound and lapping compound from highly finished, precision metal parts. A separate conveyor is used in each member. The parts are tumbled from the first-member conveyor onto the second-member conveyor, which carries them through a soluble oil slush-coating and drying process within a second housing.

If parts are to be gaged immediately following the drying operation an additional run-out conveyor is employed. This carries them through cold air blower draughts, which bring them to room temperature.

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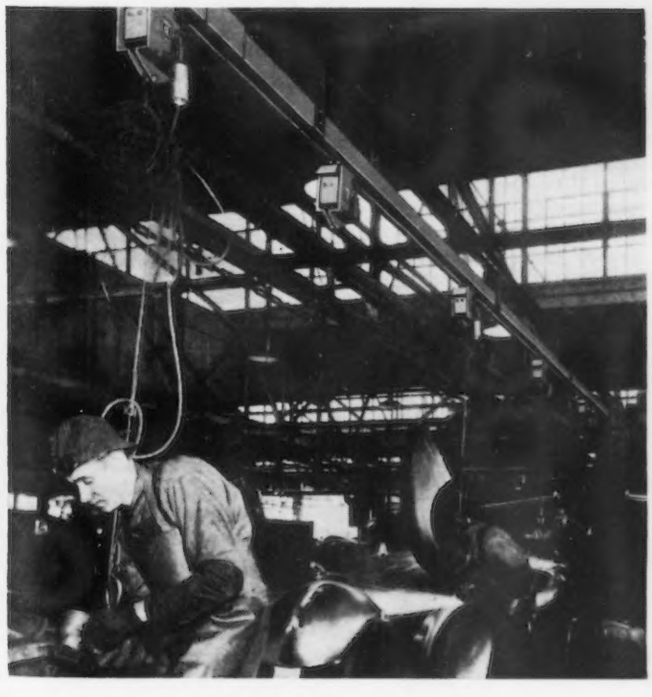
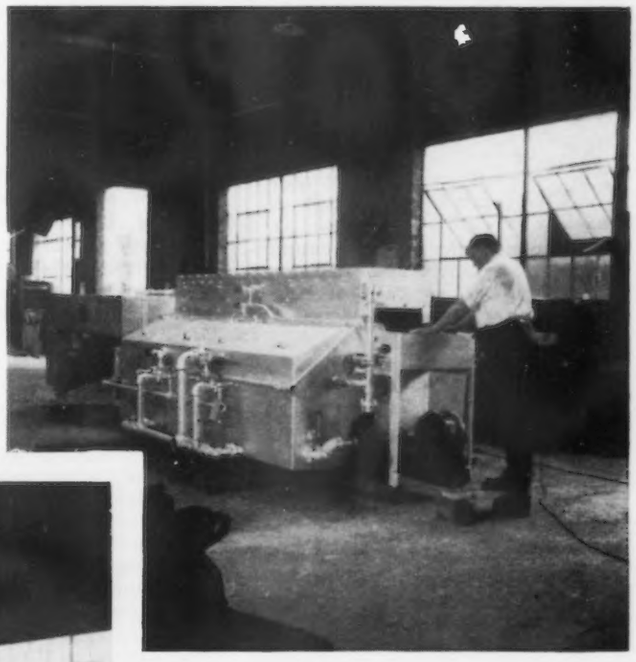
PORTABLE electric tool units are placed in traversing position or are removed through push-back gates conveniently located in sectional ducts.

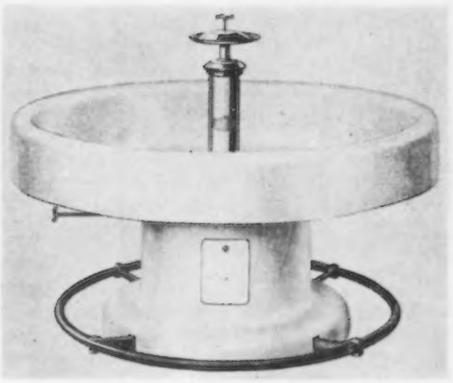


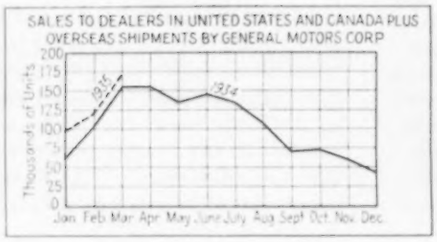
THE two illustrations below at right are of cleaning equipment: the upper involves metal parts: the lower serves shop employees.

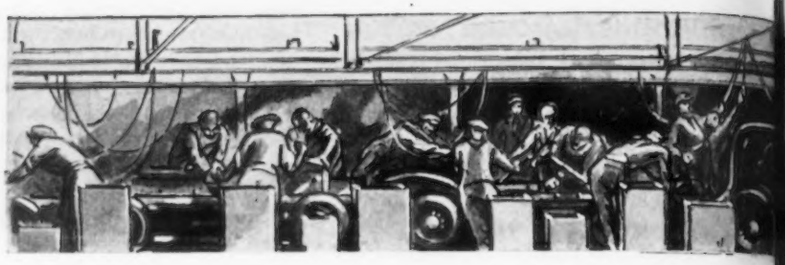


Round Wash Fountains Made of Iron Pressings

ENAMELED wash bowls of one-piece pressed iron are announced by the Bradley Washfountain Co., Milwaukee, Wis. Pedestals consist of No. 10 gage members fabricated from iron pressings and having reinforcement of special design. The electrically welded cylindrical superstructure is finished in either vitreous enamel or high-bake (350 deg.) synthetic enamel, each acid resisting. The bowls are 54-in. diameter, with either apron or roll-rim and accommodate 10 users. Hand or foot control of water flow is available. Freedom from breakage and light weight are stressed as important considerations.







THIS WEEK ON THE

Motor Car Production at Year's Peak As Retail Sales Continue to Expand

DETROIT, April 23.

AT the height of a more than seasonal rise, the automotive industry continues to bubble with enthusiasm. Sales reports from all parts of the country have been so favorable that the cup of good cheer in Detroit is running over. And the trend of retail deliveries of new cars indicates that the cup is likely to be brimful for at least several more months.

Chevrolet is understood to have sold to consumers over 30,000 units in the first 10 days of April. As the initial period is traditionally the poorest during the month, it appears certain that Chevrolet's retail sales this month will be well above 160,000 units. At the same time Pontiac made retail deliveries of 5126 cars in the first 10 days of this month and estimates April sales by dealers at 18,000 cars. Oldsmobile set a new high mark early this month, with promise of still further expansion.

Chrysler Corpn. sold 34,852 cars and trucks in the first two weeks of April and delivered to consumers 70 per cent of its production during the first quarter. Through April 10, Ford dealers had sold this year 334,437 units, compared with 328,607 units in the entire year of 1932. Statements exuding optimism as measured by actual sales demand are being issued by other car manufacturers.

There are no black spots on the automotive sales map for the first time in several years. For a long time the region embracing the Mississippi Valley and the South made this map a blotched affair, but happily the recovery in agriculture has been sufficient to restore some of the purchasing power in that vast area. Even in the dust storm sector retail sales have held up remarkably well. Largest gains have occurred in the South Atlantic States and in the Middle West (Ohio, Indiana, Illinois, Michigan).

Truck Sales High

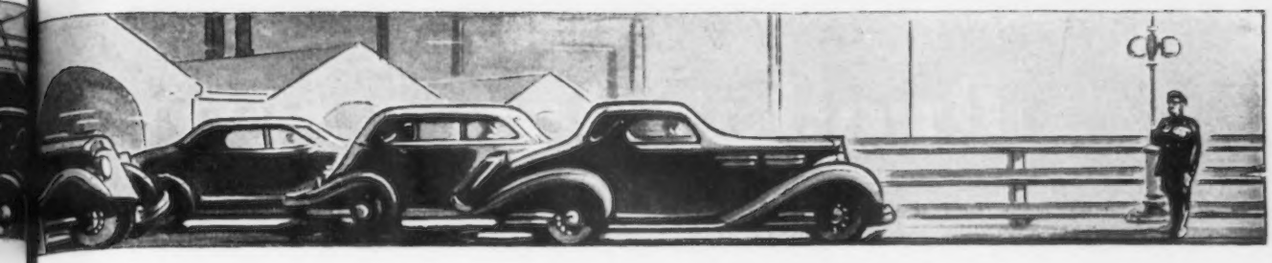
Commercial car and truck sales as well as passenger car sales have been soaring this year. Latest returns show that truck registrations in the first three months of 1935 totaled over 110,000 units, establishing an all-time high for that period. Sales in the first quarter of 1929 amounted to 108,905 units and in 1930 to 104,315 units. Not the least among the factors contributing to extraordinary production of trucks have been purchases by the Federal Government, which has bought over 36,000 units since Jan. 1, with the Department of Agriculture and the CCC the most important sources of business. In all of 1934 the Government ordered only about 21,000 units, of which the War Department took half and the CCC 25 to 30 per cent.

Prospective Government orders for trucks run into impressive figures. Under the work-relief program now being launched, the CCC is reported to be preparing to ask for bids on 25,000 units. The War Department has pending in Congress a measure authorizing expenditure of $22,000,000 for further motorization. The indirect benefits of the work-relief program, in connection with construction projects, will be felt by truck makers.

Chevrolet has received the largest chunk of the Government's truck business this year. Dodge is understood to have participated to a considerable extent, as have some of the smaller companies. Reo, for instance, has just completed shipments of trucks on an order involving $1,500,000. Ford, despite the apparent truce now existing between it and NRA, is reported to have had slim Government pickings. Ford, of course, has bid on Federal business through a dealer, whereas General Motors has submitted direct bids through its Fleet Sales Corpn.

Unfilled Orders Are Large

The outlook for May is just as good as it was a week ago. Production should be in excess of 400,000 units. There is no hint of a slackening in Ford's rate of over 6000 units a day, six days a week. As against 165,000 units this month, Ford has 150,000 to 155,000 cars scheduled for next month. Chevrolet is reputed to have on hand more than 70,000 unfilled orders. It will continue at full capacity through May and probably June, as will Pontiac and Olds. All Chrysler divisions have 102,041 orders on their books and should maintain their present pace of around 19,000 cars a week well into May. Independents also have felt the impetus of an invigorated



ASSEMBLY LINE

BY BURNHAM FINNEY

Detroit Editor, The Iron Age

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retail demand. Output in April is likely to be 475,000 units.

Although the "full-speed-ahead" signal still applies in production departments, automotive releases to steel mills and to parts suppliers have shrunk appreciably. This is not an alarming development, since it presages an expected tapering of operations in June. It chiefly infers that car manufacturers are beginning to pare inventories in anticipation of a seasonal slide in activities in the third quarter.

Used Car Situation Serious

Alarmingly large stocks of used cars constitute the ball and chain on new car sales at the moment. If these shackles can be removed by means of special advertising and sales promotion drives, nothing will stand in the way of a high sales total in the next few months. The trouble is that, according to reliable reports, a large number of 1934 models have been traded in on 1935 cars in the low-price group, the actual cash outlay in the transactions sometimes having involved little more than $75 to $100.

What about 1936 models? It is pretty well agreed in the industry that they will closely resemble current models in outward appearance. General Motors, for example, isn't contemplating anything startling in body changes. A few alterations in fender and hood design should be enough to distinguish the cars from their predecessors. Turret tops, of course, will be on all General Motors lines. Even the mechanical changes don't yet promise anything revolutionary.

The point is that all car manufacturers are eager to be on the starting line with adequate dealer stocks when the industry fires the gun in the fall for the first 1936 sales dash. They have seen Chevrolet fall by the wayside this year because of production difficulties and they don't intend to be caught in like manner late this year. General Motors in particular will play safe by seeing that all its car divisions have their production machinery well oiled before show time. This can best be accomplished by holding changes down to a minimum.

Use of Welding to Increase

The hint is that welding, which already is performing an important part in automobile manufacturing, probably will loom more prominently in 1936. One development which seems likely to be widely adopted in the next year or two is the building of the frame and the body as an integral unit. This will involve increased use of welding. Incidentally, the new frame construction is one of the many innovations in automotive design which the industry owes to the 1934 Chrysler and De Soto Airflow cars. While car makers were derisively commenting on the Airflow's snub nose and referring to it as a "misfit," they were busy copying many of its features for their 1935 jobs. Walter P. Chrysler may have lost money in this pioneering feat, but he had the satisfaction of seeing his competitors jostle each other in the rush to be the first to adopt the Airflow's good points.

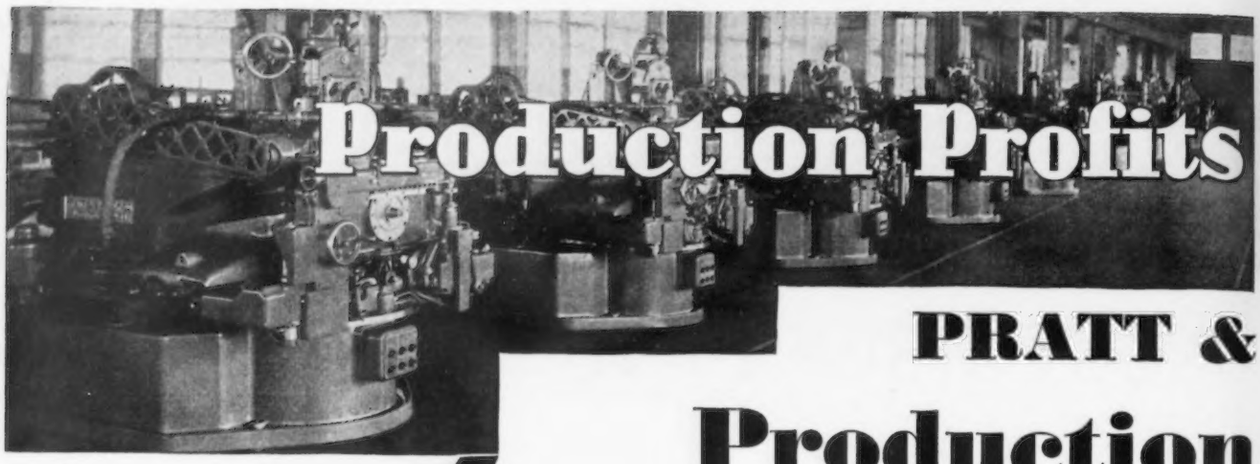
Welding may yet be used in connection with the manufacture of cylinder blocks. One of the large automobile companies has been experimenting with production of what might be termed a "skeletonized" block of cast alloy iron on to which is welded pressed steel sides. It is intimated that these sides may be of stainless steel. The main saving in cost would be in the lighter weight of the block, calling for less cast metal, and in simplification of design which would eliminate some intricate foundry operations.

The so-called liquid flywheel is another development which is said to be drawing the attention of some car manufacturers, particularly Buick. This is a European feature now in use on a few relatively high-priced cars. Buick, by the way, is understood to have made some of those eleventh-hour changes in design for which the industry is famous and consequently has been forced to scrap some new dies. How much, if any, these changes will delay introduction of the 1936 Buick is not known.

Olds to Expand Slowly

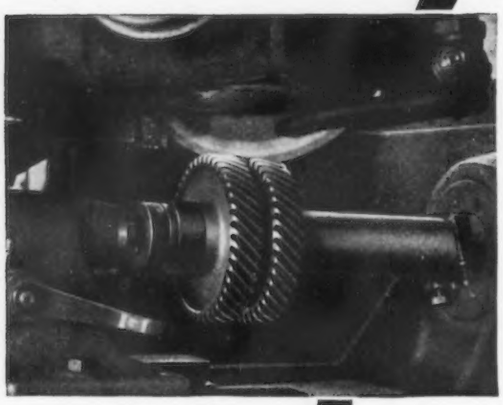
Equipment makers shouldn't raise their hopes too much because of the acquisition of the former Durant plant at Lansing by Olds. Authoritative reports say that Olds will expand its capacity cautiously, starting out by tooling up for about 1100 cars a day. Eventually its production facilities will be raised to 1500 a day.

Automotive foundry operations are at the top. Ford is pushing its foundry to capacity and placing overflow business outside. Dodge is running full speed. The Chevrolet foundry at Saginaw is melting 2000 tons of gray iron daily, six days a week. It is reported to have on its docks close to 60,000 tons of pig iron shipped in on a reciprocal pig iron-scrap contract with a Cleveland steel company. Incidentally, much pressure is being exerted by interested parties to break up the annoying and—to non-participants — costly practice of car manufacturers of closing large deals for materials on a reciprocal basis. The weapon which the persuaders threaten to bring into use is a boycott of cars made by the offending companies. Already this treatment is having a beneficial effect, because nothing can make an automobile company change its mind faster than the dangling in front of its eyes of lost sales.



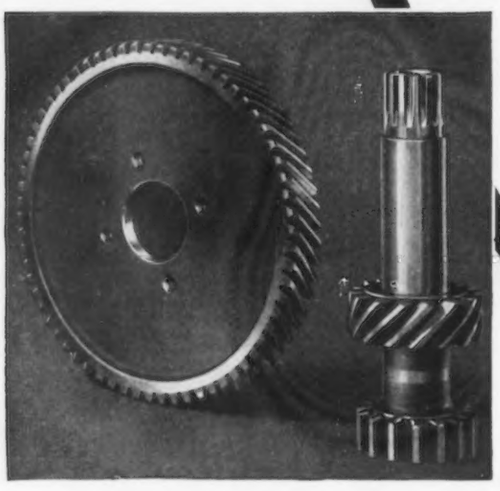
Production Profits

PRATT & Production



Above are two helical gears being ground. The straight sided wheel passes back and forth, grinding a side of two adjacent teeth simultaneously. The work rolls past the wheel under the guidance of a master gear and master rack.

Below are typical gears which are being ground at lower net costs.



IN today's metal working industry, Accuracy is the hub. Without it, few, if any, will survive. All metal products will be made to higher standards. The low-priced cars will be made with the Accuracy only the most expensive cars used to have.

Gearing today is an outstanding example of better work at lower cost because of improved Accuracy. Take automotive gearing in particular. The heavy whine of first and second gears is going—is being replaced by silent, efficient, *accurate* ground gears. Most startling of all, the net result is *a far better job, at a lower cost.* Gear grinding frequently eliminates enough other manufacturing operations to make a real saving.

The Pratt & Whitney Hydraulic Gear Grinder is the machine which has made low-cost gear grinding possible. With it either helical or spur gears can be ground quickly to limits of .0002″ in tooth spacing and profile. Its efficiency has been established by dozens of machines in steady week after week production. One man can operate two machines and maintain a smooth high output.

If you use gears you should know the facts about gear grinding and its many advantages. A letter to our nearest branch office or directly to us at Hartford, Conn., will bring you some interesting data.

Sales Offices and Agencies:

BIRMINGHAM	CLEVELAND	PITTSBURGH
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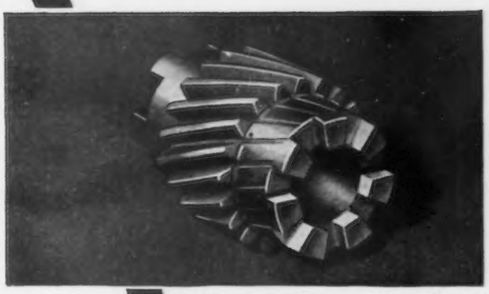
Are you one of those still under the impression that the use of ground gears must be expensive? It no longer is true. Ground gears, with their many advantages, can be even cheaper than ordinary hardened gears. It will pay you to know the newest ground gear facts.



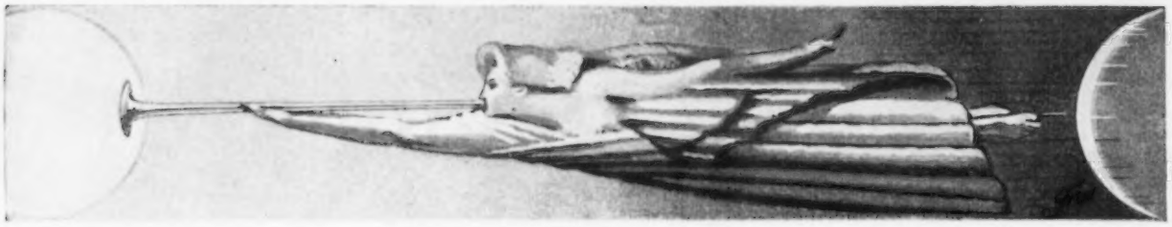
Our engineers can be of real service to you in solving your gearing problems. Grinding can produce satisfactory results in many a noisy and troublesome gear application.

Gears like these are being ground to fine limits on regular production schedules. We can give you complete cost data.

This is a front quarter view of the P & W 10" Hydraulic Gear Grinder for helical or spur gears. Do you want information about it?

Write for data

Hartford, Connecticut



NEWS OF THE WEEK

Surcharges in Intrastate Traffic Approved in Only Eight States to Date

CONFUSION arising from the new freight surcharges is expected to persist for some time to come. Thus far the only States that have approved the increased rates for intrastate traffic are: Illinois, Indiana, Maryland, New York, Rhode Island, Vermont, West Virginia and Maine. The State of Illinois made an exception for switching charges in the Chicago district which it left unchanged.

In 37 States the new surcharges are delayed, at least for the time being. In most cases the railroads filed intrastate tariffs to go into effect on five days' notice. Ordinarily, under the law, there must be 30 days' notice and most States would not permit the rates to go into effect before the expiration of that customary waiting period. If, after the expiration of 30 days, the State regulatory bodies do not deny the application for an increase, the surcharges will automatically become effective.

The only States which have thus far actually denied the applications of the railroads for the surcharges are Ohio and Wisconsin. Pennsylvania is holding hearings this week, but is expected to approve the advances. The New Jersey commission will hold hearings some time in May.

Coal producers are particularly strong in their opposition to the freight surcharges and may demand hearings in a number of States, thereby delaying action in rates.

In the case of States which have denied the applications for advances, the railroads may file 13th section applications with the Interstate Commerce Commission, the sequel of which will be a series of hearings to determine whether the existing intrastate rates constitute a burden on interstate commerce. In the event of a decision favorable to the railroads, the State commissions would be forced to sanction the surcharges which they had denied. Action of this kind, of course, takes time, and it is possible that when a decision is finally rendered the period in which the surcharges are to be effective will have expired.

G.E. Launches Huge Housing Program

A HOUSING program designed to produce one new house for each 100,000 of population throughout the country by Sept. 1 has been launched by the General Electric Co., with the announcement of its home building program. The general plan is to offer selected builders new ideas, prize-winning drawings, substantial discounts and terms on electrical equipment, and national advertising and support, all in consideration of the construction by these builders of demonstration style houses. The company is already assured of the cooperation of the Federal Housing Administration and of numerous builders, publishers and banks which are anxious to help. The houses are to be opened to the public during September and October.

An outgrowth of the recent General Electric architectural competition, in which more than 9000 architects submitted some 2000 sets of drawings, the program will be carried out through committees formed in the various sections of the country during this month. The jury in the competition selected 52 prize-winning drawings, which indicated that architects the country over have discarded many old conceptions and that during the lull in building the invention and use of new equipment and materials has continued. The company believes that the changed social and economic outlooks have had their effect and that the material evidence will soon appear in new and different houses.

J. F. Quinlan, who was in charge of the architectural competition, will be in charge of the new organization for the building program, with headquarters in New York. The General Electric Co. will be represented in the larger communities by district committees composed of specialty appliance, merchandise and air conditioning distributers, working with the company's district office managers and field representatives of the various departments. In communities where there are no major distributers representing the company, local committees of dealers are to be organized. The plan wili be presented by the committees to the local utility companies for their support, and each committee will select builders in order that construction may start as soon after May 1 as possible.

PERSONALS

WILLIAM B TODD, F. E. FIEGER and DWIGHT CLARK have been elected directors of the Jones & Laughlin Steel Corpn., Pittsburgh. The elections were to fill a vacancy and to occupy additional directorships created by action of the stockholders at the annual meeting this week.

William B. Todd was made vice-president in charge of sales as well as director. He has been general manager of sales since March, 1930. On March 1, 1930, he was made assistant general manager of sales in charge of the company's automotive business, and prior to that time had been manager of sales of the cold-finished division. For many years previously he had been affiliated with the Union Drawn Steel Co., Beaver Falls, Pa., having served at one time as vice-president of that concern.

F. E. Fieger, who since 1929 has been general manager, was made a director and a member of the executive committee, and vice-president in charge of operations. He joined the Jones & Laughlin company in 1917 as superintendent of the wire department, Aliquippa works, and the next year was made superintendent of steel works. He was made assistant superintendent at Aliquippa in 1920; general superintendent of that plant in 1923; assistant general manager of the company in January, 1928, and general manager in October, 1929.

Mr. Clark is treasurer of the Phillips Properties, Inc., owned by a branch of the Laughlin family.

JOHN A. CALLAHAN has been appointed head of all operations of the pressed steel plumbing ware division of the Briggs Mfg. Co., Detroit. He has been identified with the Briggs company for more than three years and for the last two years has directed the company's development work in plumbing products. The Hamtramck plant, which has been remodeled and equipped for big-scale production of plumbing ware, will be under his supervision.

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ANDREW M. ONDREYCO, until recently operating metallurgist for Westinghouse Air Brake Co., Wilmerding, Pa., has joined the Meehanite Metal Corpn., Pittsburgh, as chief metallurgist. He is a graduate of the Carnegie Institute of Technology and served for a year as chemist with the Firth Sterling Steel Co. He later spent four years in the United States Bureau of Mines and a year with the New Process Copper Casting Co. He became identified with the Westinghouse company in 1924.

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F. M. RANDLETT, heretofore Pacific Coast manager for Robert W. Hunt Co., Chicago, has been appointed vice-president and general manager of the company at Chicago. M. H. MERRILL, who has served as consulting engineer for the company at San Francisco, has been made Western manager. For many years Mr. Merrill was identified in an engineering capacity with various utility and transportation companies and was president of M. H. Merrill & Co., consulting engineers, from 1919 to 1932.

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HOWARD F. GRAFF, formerly identified with the Cleveland wire works of the General Electric Co., has joined the research staff of the Universal Steel Co., Bridgeville, Pa.

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FREDERICK W. BIERWIRTH, who has been assistant works manager since 1931 at the Kearny, N. J., works of the Western Electric Co., has been elected vice-president of the company and appointed works manager of the company's Kearny works. He has been connected with the company since 1912.

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MYRON C. TAYLOR, chairman of the board, United States Steel Corpn., sailed for Europe on the Bremen, April 19.

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R. F. BLACK has been elected president of White Motor Co., Cleveland, to succeed A. G. BEAN, who continues as chairman of the board. For the past four years Mr. Black has been president of the Brockway Motor Truck Co., Cortland, N. Y., and previous to his connection with that company was vice-president of the Mack International Motor Truck Corpn.

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OLIVER F. REDD has joined the research department of the Patterson Foundry & Machine Co., East Liverpool, Ohio. Mr. Redd received his schooling at the University of Illinois, University of Chicago and the Southern Illinois Normal School, and for several

(CONTINUED ON PAGE 71)

WILLIAM B. TODD

F. E. FIEGER

J. A. CALLAHAN

A. M. ONDREYCO

Republic Develops "Double Strength" Steel for Railroad Applications

By HOWARD L. MILLER
Metallurgist, Republic Steel Corpn. Massillon, Ohio

TWO of the most important factors in the high cost of rail transportation are the tremendous weight of rolling stock as compared to the paying load, and the rapid deterioration of equipment due to continual exposure to the elements, with resultant rusting and corrosion.

Decreased weight means increased pay load and higher speeds. Increased resistance to weathering and corrosion means decreased maintenance and much longer life. Higher speed is the railroad's answer to the public demand for quicker delivery, faster schedules, etc., and the decrease in carrier weight will go far toward improving the performance of motive power in delivering goods.

The experiments which have been made recently in using steels of special analysis, aluminum alloys, etc., in the construction of freight cars, indicate that transportation men are actively seeking some way to improve the position of the railroads by decreasing weight as well as by increasing performance.

The contribution of Republic Steel Corpn. to this vital and pressing need has been the development of a copper-nickel-molybdenum steel which offers a combination of high strength, ductility and resistance to atmospheric corrosion. Republic Double Strength steel is a result of several years of special research based on many more years of experience in the production of copper-bearing steel and copper-molybdenum alloy iron. It is manufactured by the largest producer of alloy steels in the world.

The effectiveness of this combination in increasing corrosion resistance has been demonstrated both in service and in officially conducted tests. Republic Double Strength steel is said to show similar characteristics, since it is of the same type. It is significant that Republic Double Strength steel shows an exceedingly tight oxide skin under exposure to the most severe industrial atmosphere, and for this reason is particularly advantageous in railroad and automotive truck equipment used in carrying coal and other corrosion-promoting products.

High Copper Content

This steel is the first analysis, showing as high a copper content, to be placed on a commercial basis in rolled products. The physical properties of the two grades as shown below can be increased 15,000 to 20,000 lb. per sq. in. by tempering sheets at 900 deg. to 1000 deg. for about 1 hr. of temperature. The commercial value of these higher properties is somewhat problematical at present, but the fact that these higher physicals can be easily obtained may cause the engineering profession to develop useful applications for them.

The steel is made in two grades, the chemical and physical specifications of which are as follows:

Grade 1	Per Cent
Carbon	0.12 max.
Manganese	0.50/1.00
Copper	0.50/1.50
Nickel	0.40/0.80
Molybdenum	0.20 max.

Grade 1-A	Per Cent
Carbon	0.30 max.
Manganese	0.50/1.00
Copper	0.50/1.50
Nickel	0.40/0.80
Molybdenum	0.20 max.

Physicals on Normalized Sheet, Strip and Plates

Yield point, lb. per sq. in. min.	60,000	Yield point, lb. per sq. in. min.	70,000
Tensile strength, lb. per sq. in. min.	75,000	Tensile strength, lb. per sq. in. min.	90,000
Elongation in 2 in., per cent min.	25	Elongation in 2 in., per cent min.	18

In order to fabricate satisfactorily such large sections which cannot be annealed or heat treated after welding, it is necessary to have a high strength material which does not air-harden. Republic Double Strength has little tendency to air-harden; hence it is very adaptable to welding by the arc method. It can also be satisfactorily spot resistance-welded.

With the proper welding wire and procedure, tough, strong welds are readily produced. Material under 16 gage should be spot welded, as it is too light to weld satisfactorily by other means. Arc welding can be accomplished satisfactorily on material as light as 16 gage. No difficulty is encountered in welding the heavier gages.

Wide Choice of Alloying Elements

The metallurgist has a wide choice of alloying elements from which to make selections to use in raising the physical properties of the present structural steel. These alloys fall into two groups or classifications, with regard to the nature of the strengthening effect they have upon the original analysis. The first of these groups is called the carbide formers or pearlitic group of alloys. The second group includes the alloys that affect the strength of the ferrite.

Even with its unusual combination of high strength, corrosion resistance and ductility, this material can be fabricated without difficulty. It lends itself readily to any of the operations required in the construction of railroad equipment.

(CONTINUED ON PAGE 74)

THIS WEEK IN WASHINGTON

A. F. of L. to make strenuous drive for passage of Wagner Labor Disputes Act.

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New Deal steam roller dragged out for passage of social security legislation.

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NRA argument with Colt's company seriously embarrasses Army and Navy.

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Steel code exemption application being given thorough study.

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Continuation of NRA with modification is urged by General Johnson.

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BY L. W. MOFFETT

Resident Washington Editor, The Iron Age

o o o

WASHINGTON, April 23.—Neatly timed, organized labor has ordered its forces throughout the land to gather in Washington on April 29, just when the Senate Committee on Labor and Education is in executive session considering the Wagner labor disputes bill. . . . But it must be said for President William Green of the A. F. of L. that if he attempted to make the move appear as a mere coincidence he gave it such a thin veneer that it was easy to see through. . . . That he obviously meant the "conference" to be a demonstration for the benefit of Congress as it considers labor bills is evident from his statement that "the conference is called for the purpose of giving expression to the almost universal desire of working men, women and their friends throughout the United States for the enactment of the Wagner labor disputes bill and other legislation now pending in Congress sponsored and approved by the American Federation of Labor." . . .

This conference, to be made up of representatives of national and international unions, State federations of labor and city central bodies, so Mr. Green says, will represent more than 6,000,000 workers directly and approximately 10,000,000 more indirectly. . . . It is designed to show its teeth to Congress and enable the latter to realize the pitfalls which will lie in its political path if it does not jump through organized labor's hoop. . . . This implication may be read on the run in the statement that "the purpose of the conference is to deal definitely and concretely with the Wagner labor disputes bill, the Black-Connery 30-hr. work-week bill, and other legislative measures which labor insists be enacted into law at this session of Congress." . . .

This, of course, is not a gigantic lobby. . . . Lobbies are conducted solely by the other side. . . . The other side gets honorary mention in the statement. . . It says that "manufacturers' associations, large employers of labor, corporations, and financial interests are carrying a campaign of opposition which is most unusual and extraordinary. Labor must meet this opposition by concentrating its efforts, by speaking collectively here in the capital city, by mobilizing full and complete support of labor and all its friends in behalf of the Wagner labor disputes bill and other measures pending in Congress which have been given the endorsement of the American Federation." . . . There's nothing naive or shrinking about this sort of a last-ditch drive to force through organized labor's pet measures, though it is still doubted that many leaders of organized labor care to see the Black 30-hr. bill enacted. . . . And in all probability it will not. . . .

So, too, there is continuing doubt that the Wagner bill will be passed, but the big push is to put it over. . . . The other measures largely are window-dressing. . . . The Wagner

bill is the object of warm differences in Congress. If it is enacted, organized labor will not care what becomes of the highly controversial Section 7-a. . . . And indeed it is a question if organized labor would be especially concerned over extension of the recovery act if the Wagner bill went over the top. . . .

Talk as anti-New Dealers will, they are forced to bow to the New Deal for the machine-like precision with which it pushed the social security bill through the House, piling up 372 votes against a pitiful 33. . . . And this piece of social legislation likely will go through the Senate in about the same ratio. . . . With perhaps a great deal of revision in a year or so, especially in the way of changing rates. . . . It was these about which controversy raged chiefly rather than the principle of the measure which carries old-age pensions, unemployment insurance, and other welfare benefits for which industry will be called upon to pay its share but which a large section of industry has favored in principle. . . . As passed by the House the bill provides for pensions for needy persons over 65, the Federal Government to match the States on a 50-50 basis up to $15 per month; supplemental compulsory old-age annuities to be financed through a graduated 2 to 6 per cent tax imposed on employers and workers alike; a system of unemployment insurance starting in 1938 to be paid out of excise taxes on employers, and involving cooperation between Federal and State Governments. . . . Ultimately new taxes arising from the bill are estimated to produce approximately $2,783,-200,000 annually. . . . Exempted, with their employers, from taxes for both old-age annuities and unemployment insurance are persons already over 65, together with farmers and others in special occupations or vocations. . . . These classes, however, could get pensions under the first section of the bill under which the Federal Government would contribute up to $15 a month for old-age pensions to the needy. . . .

Some of the strongest New Deal supporters are disappointed at the apparent yielding by the White House to the bonus "compromise" which Senator Pat Harrison has introduced in the Senate and says will be supported by the President. . . . They insist that the Patman bonus bill would have been killed had the Administration stood by its guns. . . . The Patman bill, pushed through the House recently, would have gone through the Senate but it could not have survived a Presidential veto. . . . Now the Harrison "compromise" will cost $500,000,000 more than the present law . . . and it won't even have the merit of satisfying those veterans who wanted to go all the way of greenbackism, inflation and exorbitant taxes involved in the Patman bill. . . . Certain it is that the taxes are to be ground from industry and the people generally under the Harrison bill, and quite conceivably inflation, pension raids, and what not. . . .

Those who oppose these things, of course, are obstructionists, destroyers, myopic croakers, and so on . . . which is remindful of the best statesmanship of the past week, the plumb going to Representative Maverick, Democrat of Texas. . . . He must have heard a chorus of 120,000,000 approving voices from a tired nation when he said that the whole country is bored at the wave of "underslung language" coming from both New Dealers and their foes. . . . "Harsh language is arousing class against class, section against section, and friend against friend," observed the Texan, who included in phrases he strongly resented the unmitigatedly asinine blast by Federal Relief Administrator Harry L. Hopkins that "Pennsylvania gives me a pain in the neck." . . . Yet, paraphrasing a historic remark of the past, "Pennsylvania, there she stands!" . . . strange as that may seem to the eruptic Hopkins. . . .

When in a jam blame the press. . . . A trick, hoary from age, and, strange to say, it often works. . . . One of the latest stunts of this kind was pulled in connection with the hitch between the NRA and the Colt's Patent Fire Arms Mfg. Co., following removal of the Blue Eagle from the company for alleged violation of Section 7-a. . . . NRA now is trying to see what it can do to bring about settlement of the case. . . . Instead of conceding that it gummed up the works by ordering removal of the Blue Eagle on the same day that the company had written NRA agreeing to recognize the joint council of American Federation of Labor unions, Chairman Donald R. Richberg of the NIRB passed the buck to the press, after taking a sly dig at the Special Munitions Committee of the Senate. . . .

Implying that a settlement had almost been negotiated, Mr. Richberg added that "publication of a great many rumors and inflammatory articles had the natural effect of creating new hostilities and misunderstandings," resulting in failure to reach an agreement. . . . Certainly so far as the reading public generally is concerned it has seen nothing printed except what has come from authoritative sources. . . . Mr. Richberg especially objected to statements printed in Hartford, Conn. . . . There can be no doubt that much of the hostility of which Mr. Richberg speaks has come from publication of the Government's crackdown publicity following the order of the National Labor Relations Board. . . .

The Colt company case has stirred New England industry generally, which feels that the company has been unfairly treated by the Government. . . . The company adheres to or even exceeds code requirements as to wages and hours, and its high standing is not questioned by any source. . . . As it happens, it is the only source of supply for machine guns for the Army and Navy. . . . Taking away the Blue Eagle put the Government in a predicament. . . . For under an executive order the Government cannot purchase from a Blue Eagleless concern. . . . What would become of existing contracts the Army and Navy have with the company if the torpid old bird is not restored to the Colt roost? . . . To do or not to do, that is the question NRA has been debating. . . . Whether to or not to notify the Army and the Navy of action taken with a view to preventing them from doing business with their only source of machine guns.

The Joint Council of Unions, representing what the labor board has designated as the proper collective bargaining agency at the Colt plant, has found what to it is an easy answer. . . . It has told Mr. Richberg to notify the War and Navy Departments that existing contracts should be revoked. . . . Let the Army and Navy arm with popguns. . . . And what is a contract but a mere scrap of paper, regardless of whether or not a sovereign government is one of the parties to the contract? . . . The gold clause also was a contract. . . .

Mr. Richberg found it "unfortunate" that he was asked to testify before the Special Munitions Committee while the Colt agreement was being negotiated and succeeded in having the testimony postponed, which the committee didn't like, but Senator Nye, chairman, apparently has been appeased, in view of his statement that he has been advised that Mr. Richberg is going to notify the Government departments that Colt's has lost the Blue Eagle. . . .

Madam Perkins, ever hopeful, has told President Roosevelt that a new effort by the Department of Labor to settle the Colt controversy was showing progress. . . . Meanwhile Mr. Richberg, seeing that NRA's withdrawal of the Blue

Eagle has proved a dud, told the Senate Munitions Committee that he is prepared to testify in case. . . . So another endless dispute drags its way along as the country becomes increasingly jittery. . . .

Henry Ford not only never had the Blue Eagle, but apparently he refuses to have it even if the Government attempts to thrust it upon him. . . . This was indicated recently when the Government had loosened the executive order barring non-Blue Eaglers from selling to the Government. . . . And the relaxation of the order was done especially for Mr. Ford in order that he could bid on a large quantity of trucks, sedans and ambulances asked for by the War Department. . . . The Ford company did not so much as offer a single bid. . . . Previously Government departments were told by NRA that they could purchase Ford spare parts for trucks and cars despite the fact that Ford has no Blue Eagle. . . . Which in itself must have been humiliating to the thunderbird. . . .

Another famous holdout against the Blue Eagle still holds out and no doubt always will. . . . No less a personage than the doughty and able Carter Glass, old line Virginia Democrat, United States Senator and newspaper publisher. . . . Meanwhile the Blue Eagle is in the cockpit to defend itself against foes who seek to pluck and lay it low. . . . The act's constitutionality is to be tested in connection with the Schechter Poultry Corpn. case on which the Supreme Court has agreed to hear arguments May 2, and it is expected the court will hand down a decision before it adjourns early in June, giving Congress, it is hoped by the Administration, time to pass on legislation to continue NRA. . . . The present act expires June 16. . . . Solicitor General Stanley Reed will have Mr. Richberg as his assistant, specially chosen by the Department of Justice as assistant attorney general to aid in arguing the case. . . . The Circuit Court of Appeals of New York upheld NRA on 17 out of 19 counts. . . . The two counts on which the Government lost involved the important code provisions as to hours and wages, and the Supreme Court will be asked to determine whether Congress, under the commerce clause of the constitution, had authority to provide minimum wages and maximum hours for slaughter house employees. . . .

Then there is the case of Fred C. Perkins, York, Pa., battery maker, thrown into jail for refusing to pay the minimum wage under NRA, despite the fact that the York compliance board had recommended code exemption for his plant in order that he might keep it in operation and maintain employment. . . . Mr. Perkins told the Senate Finance Committee that five of the most prominent attorneys in the country have promised to assist his attorney in appealing his conviction. . . . He was one of the last witnesses at the NRA hearings, which were brought to a fitting close with the lively testimony of former Administrator Hugh S. Johnson last Thursday. . . . And now the committee has any variety of testimony it could possibly care for as to the merit or lack of merit of NRA, the first noble experiment of the New Deal.

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NLRB Issues Order Against Metal Company

In an order announced Monday, the National Labor Relations Board required the Geuder, Paeschke & Frey Co., Milwaukee, metal products manufacturer, to stop hindering self-organization of its workers and "to make clear to them that they will not be discriminated against because of membership in any particular employee organization." The company was given 10 days in which to comply with the decision and clear itself of the alleged violation of Section 7-a. The case grew out of a complaint filed with the Milwaukee Regional Labor Board by Fred Taylor, an employee, who maintained he was discharged because his son, Walter, had taken a leading part in organizing a trade union in the plant.

The Milwaukee board was sustained in its findings that Walter Taylor had been laid off for reasons of economy and not because of alleged threats by a foreman that Fred Taylor "would get the worst of it" unless his son ceased his union activities. The National Labor Board, however, said the threats "were found to have a clear tendency to inhibit self-organization, in violation of the workers' rights." Walter Taylor himself was discharged for smoking and, in his own words, according to the National Labor Board, "rowdyism in the shop." In June he was rehired and became active in union affairs.

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Steel Code Exemption Application Attracts Interest

Much interest is being shown in the application of the Northwestern Barb Wire Co., Sterling, Ill., for exemption from Section 2, Article V, of the iron and steel code which prohibits construction of new blast furnace, Bessemer converter or open-hearth capacity. The application is the first ever made to the National Industrial Recovery Board for any kind of exemption from a provision of the iron and steel code. Such exemption can be granted only through amendment to the code or by suspension of operation of the provision by the President.

The application has been sought by the company in order that it might erect open-hearth capacity for 100,000 tons of ingots annually. At present the company has neither steel making nor rolling capacity but purchases its wire rods for drawing into finished products. In the event that open-hearth capacity is erected, this would necessitate rolling mill capacity. Reports coming to Washington from the trade indicate that suggestions may be made that the company purchase its billets, to be rolled into rods, thus making unnecessary any capacity now barred by the code.

Facts or suggestions or objections regarding the application are all to be submitted to Deputy Administrator R. W. Shannon by May 2, while power to grant or deny the exemption rests with Divisional Administrator Wayne P. Ellis, acting for the NIRB. The material submitted is to be assembled and studied by Mr. Shannon after which it will be laid before the NRA legal division, the research and planning division and the Industrial, Labor and Consumers' Advisory boards for study. The action of these different NRA bodies will then be submitted to Mr. Shannon prior to his presenting the case to Mr. Ellis for final determination.

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Chamber to Discuss Durable Goods Situation

One of the most important sessions at the twenty-third annual meeting of the Chamber of Commerce of the United States in Washington April 29 to May 2 will be a round-table conference on durable goods and housing to be held at the Mayflower Hotel on the afternoon of April 30. A. P. Greensfelder, president, Fruin-Colnon Contracting Co., St. Louis, will serve as chairman of the conference. The following subjects will be discussed: "Equipment Needs of American Industry, by John W. O'Leary, president, Machinery and Allied Products Institute, Chicago; "The Release of Capital Funds for Durable Goods Revival," by Sidney J. Weinberg, Goldman, Sachs & Co., New York, and "A Business View of the Government's Housing Program," by Dr. G. A. Nichols, president, G. A. Nichols, Inc., Oklahoma City, Okla.

NRA Continuation Predicted as General Johnson Demands Modification

WASHINGTON, April 23.—The National Industrial Recovery Act will be extended, but in a greatly modified form. In fact, it may be so markedly revised that it will be either of no interest to industry or even objectionable to it.

This is the view which appears to predominate now that the long-winded NRA hearings before the Senate Committee on Finance have come to an end. It has been expressed with full recognition of the hazard of prophecy. And the hazard is great when consideration is given to the fact that the present Congress is more like a mass meeting than a deliberative, legislative body. No previous Congress has been more susceptible to political expediency. Moreover, no previous Congress has reflected such a hodgepodge of political and economic thought as the present one.

Consequently, cutting out a finished pattern from which Congress will mold a new NRA would be a foolish performance. Certainly no definite guide is found in looking to what the Administration wants. Already it has shown that it is willing to compromise. No better proof of this is evident than the fact that Administration supporters have asked Senator Borah of Idaho to confer with them on the NRA bill. The Idaho Senator's attitude toward NRA is sharply critical. He is determined to do all he can to see that the anti-trust laws are fully restored, all forms of price fixing are barred and that the Government clearly state it is not seeking to interfere with purely intrastate business.

Senator Borah's Position

There is no doubt that the position of Senator Borah, backed by a substantial group in the Senate, with a similar attitude strongly prevalent in the house, has much support outside of Congress. It was repeatedly reflected at hearings on NRA and it is perhaps safe to say that as public opinion becomes increasingly organized it may also share the same attitude to a large extent. The voice of the people "back home" potentially has the power of shaping any new legislation that may be enacted. They are the source of votes and it is upon votes that retention of office depends. But it is a question as to whether this source of power makes itself heard.

In reviewing the volumes of testimony laid before it as it prepares to make a report on the NRA bill, the finance committee is of course finding a diversity of views regarding the first of the New Deal's many alphabetical agencies. Praise, damnation, and a mixture of both mark the long record. Outright extension of the act, scrapping, and modification have been urged. But the overwhelming sentiment was that modification is necessary. Even its most ardent supporters in effect admitted that NRA has been weighed and found wanting in some respects. Actually this formed the crux of the some 20,000-word statement made to the committee last Thursday by former Administrator Hugh S. Johnson, the final witness.

His was a statement of admission of errors and defense, followed by recommendations for changes. Nevertheless admiration was expressed for his forthright admission of failures of NRA as well as for the stout defense he made for what he conceived to be constructive accomplishments of the act. As to recommendations, he made some that unquestionably will be strongly opposed by industry as a whole, especially as to labor provisions, less hours of work and increased rates of pay.

Favors Mill Basing Points for Steel

In speaking of the steel industry, General Johnson revealed that he favored the gradual adoption of the mill base for quoting prices, the position taken by the Federal Trade Commission which the General once scored vigorously because of its attack on the steel code and the basing point system. The General was particularly emphatic in defending NRA against the oft-made charge that it suppresses small enterprises. Factual statements were presented to refute the contention and among them was an exhibit from some of the smaller steel companies which, it was pointed out, have greatly benefited from the code and want it continued. He pictured NRA as a protection for small enterprise against big business.

His declaration for shorter hours and increased rates of pay is consistent with the attitude the General took when he was head of NRA. It is also in line with the suggestion President Roosevelt made at the Washington meeting of code authorities, but it was abruptly turned down by industry generally. Though taking this position, General Johnson opposed the 30-hr. work bill, as he has done heretofore, and also said he did not believe that the country would catch up with prosperity by trying artificially to boost all wages and all prices. It was his opinion, however, that prices and income should be brought nearer to a balance. As to anti-trust laws, the General declared that attempts to legislate restraints upon competition in the public interest had failed. The remedy he proposed therefore was continuance of NRA.

Would Revise Section 7-A

Among his recommendations for "corrections" of the law was revision of Section 7-A, the collective bargaining provision of the recovery act, which the General said had failed in its original purpose. He described this purpose as giving labor the right to organize on a broad scale for representative bargaining, a purpose which he said had been frustrated. He declared Section 7-A had been so obscured by conflicting interpretations that it could not be construed as a definite labor policy.

Majority representation was advocated by the General. Under his proposal, the majority in any industry would be the exclusive bargaining agency. This principle is strongly opposed by Chairman Donald R. Richberg of NRA, and it is objected to by industry generally. It is the position of organized labor, however, and the latter's position was again enunciated by General Johnson when he said he believed the Government should control wages and hours. NRA, he said, should attempt to regulate business through codes "where it is clearly necessary to protect interstate commerce and not otherwise." The control he proposed on the basis of "affecting interstate commerce" is like the broad control proposed in the Administration bill. It is in direct conflict with the ideas of such strong critics as Senator Borah and the groups insisting upon wide revision of the act.

NRA Sharply Criticized

While General Johnson was pleading earnestly for NRA's extension, a group of Brookings Institution economists made public a report assailing NRA as retarding recovery. Interestingly enough, one of the signers of the report is Dr. Leon C. Marshall, a member of the National Industrial Recovery Board. It was stated, however, that he had contributed only factual matter and had not joined in "expressions of judgment." About the only good thing the Brookings Institution report had to say of NRA was that its "efforts to facilitate competition are its most creditable additions to the economic structure." NRA, said the report, "put

the cart before the horse" by trying to raise purchasing power by boosting costs and prices. NRA also was charged with having "done much to propagate the fallacy that raising wage rates is in itself a good thing. So far as we are aware it has made all of its wage adjustments in one direction—upward. It has gone far to spread abroad the idea that wage rates should never be reduced, and to make downward revision difficult even under adequate justification and proper safeguards." This blast met with a counter-attack from Mr. Richberg, who charged that the report was political propaganda.

In no way did the Brookings Institution report reflect a sympathetic attitude such as General Johnson had asked of the committee. He symbolized NRA as an unwashed child who would find loving parents if it were given a healthy bath.

"Clean up NRA—don't destroy it," the General pleaded. "Let us scrub our infant offspring vigorously, but let us not throw the baby down the drain pipe with the dirty water."

The Brookings report saw no such future for the child. "In view of the fact," it said, "that the two most powerful forces behind NRA —organized labor and organized industry—are generally committed in the one case to the doctrine that wages should never be reduced and in the other case to the idea of 'price stabilization' and 'cost reduction, the prospect that NRA will reverse the trend we have just described seems far from bright. We may have to be content if it refrains from a further unwarranted boosting of wage and price levels in its historic pursuit of purchasing power."

Industry Voices Opposition

The Johnson recommendation for shorter hours and higher wages met with immediate opposition from industry in a brief filed with the committee by the Automobile Manufacturers' Association. The association said further limitation in the hours provision of the recovery act would force higher prices to the consumer while definitely limiting the ability of the employer to provide his men with an adequate annual wage. The brief declared that any limitation below the 40-hr. average week now contained in the automobile code would severely penalize consumers, employees and the companies at a time when none can afford the extra costs. With respect to 7-A, the brief urged that it be amended to protect the workman against coercion from any source whatsoever and to safeguard his right to work regardless of membership or nonmembership in any organization.

Generally, it may be said that a large section of industry and all of organized labor are on the same side in this instance by supporting the Administration in seeking extension of NRA. Industry generally wants it extended for the benefits to be derived from what it declares to be protection against destructive competition. Organized labor wants to retain and expand possibilities of gaining more power from collective bargaining by way of shorter hours and higher wages.

Despite this, however, important elements of business went on record against NRA's extension, and evidently in the minds of important groups of Congress, the public generally has turned against NRA. For this reason it is believed that extensive revision of the act will be necessary if it is continued. Prohibition of any form of price fixing, the setting up of arbitrary cost accounting systems and possibly open price filing probably will be insisted upon as well as restoration of the anti-trust laws to full force. Such a modification obviously would mean that industry as a whole would find NRA objectionable.

Supreme Court Decision Important

Its extension also, of course, is dependent upon the outcome of the pending Schechter poultry case, expected to be decided by the Supreme Court before it adjourns early in June. The case involves the constitutionality of NRA. There is certainly much support of General Johnson's view that "NRA should speed a better, simpler, swifter method of appeal, that the 'Little Fellow' should have better representation on code authorities, and that an active 'Little Fellow' guardian should be added to the NRA staff." The General also expressed the view of industry when in speaking of 7-A he said there should be no coercion on either side and that membership in no union should be made a condition of employment. The General also said he thought the Government should encourage but not compel vertical unions in the principal industries with complete intra-industry tribunals for settlement of disputes, their decision to be final and both strikes and lockouts to be barred. Moreover, he said unions should also submit codes. Thus while the General frequently whacked industry, especially what he called the "big fellow," he strongly presented some of its views.

No Price Fixing In NRA

"Price fixing under NRA," said the General, "is just a big bugaboo." Then he turned to a discussion of the basing point system, implying that he views it as a price fixing device, and said it existed in other industries as well. He added that he always opposed it and suggested gradual adoption of the mill base system.

"The basing point system of the steel industry existed under the Federal Trade Commission long before NRA," declared General Johnson. "The steel industry was built upon it. The vast installations were located where they are because of it. It is not alone in the steel industry. Dozens of industries have it in different forms.

"I have always condemned it. The first thing I did when I took over a big industrial company was to abolish it.

"But you can't do that in Government—by fiat—after you have sat twiddling your thumbs for 21 years, as the Federal Trade Commission has, and allowed titanic industrial clusters to be built up on that basis.

"What NRA did was to require an increase in basing points in an already operating basing point system. It was the only way to handle the situation. By a gradual accommodation to a mill base, you can eliminate basing points by allowing a reasonable time and intelligent administration to prevent chaos and destruction."

The General then submitted an exhibit consisting of a compilation "of 20 small steel companies advocating continuance of the system." He said he had accepted the statement as it was handed to him and proposed for the record "although some of the companies do not look exactly like pygmies to me."

The General did not neglect the consumer in his testimony and denied charges frequently made, especially in the early days of NRA, that it had entirely neglected the consumer. The General tied the interest of labor and consumer together and said that it must be conserved in code administration. There should be on any Government agency set up to supervise any code, he declared, a well qualified labor adviser and a consumer adviser. This is precisely a point for which organized labor is driving and perhaps with real indications of success. The General also espoused the cause of organized labor when he said that a properly drawn collective bargaining clause, with a mandate to an administrative agency to effect it, will speed the contemplated organization of labor.

The General attacked what he said was a "lot of loose talk about 'industrial self-government' and about code authorities." Many acts of the Federal Government, he said, have been attributed to code authorities and many unauthorized acts of code authorities have been attributed to the Government.

Machine Tool Sellers Ask For Code Amendment—Other Code News

WASHINGTON, April 23.—The NIRB has approved an amendment to the code of fair competition for the machine tool and equipment distributing trade providing that the code authority for the trade shall submit to the board within 30 days after approval a list of hazardous occupations in the trade. The amendment is effective May 2 unless good cause to the contrary is shown.

Administration Members of Code Authorities

The NRA has appointed the following Administration members of code authorities: **F. W. Buck**, Washington, for the drop forging, machine tool and forging machinery, malleable iron, special tool, die and machine shop, steam engine manufacturing, mechanical lubricator, small locomotive manufacturing, gray iron foundry and the gas-powered industrial truck manufacturing industries; **C. L. Hickling**, Washington, for the warm air register, American petroleum equipment, refrigeration valves and fittings manufacturing, warm air furnace pipe and fittings manufacturing, gear manufacturing, mine car, railroad and industrial spring and plumbing fixtures industries; **E. A. Tutein**, Winchester, Mass., for the cylinder mold and dandy roll, shoe machinery, printers' rollers, cutting die manufacturing, bobbin and spool, textile machinery manufacturing, and hide and leather working machine industries;

David Newhall, Washington, for the railroad special track equipment manufacturing, bicycle manufacturing, steel casting, motor fire apparatus manufacturing, locomotive appliance, steel tire manufacturing, and railroad car building industries; **Howard B. Hall**, Mt. Vernon, N. Y., for the oil burner, industrial oil burning equipment manufacturing, pump manufacturing, heat exchange, compressed air, water meter manufacturing, and valve and fittings manufacturing industries; **Francis E. Lee**, Flushing, N. Y., on the code authorities for the mechanical packing, brass forging manufacturing, non-ferrous foundry, anti-friction bearing, motorcycle manufacturing and the alloy casting industries; **Ayres Boel**, Chicago, for the railroad brass car and locomotive journal bearings and castings manufacturing, chilled car wheel, newspaper printing press and sprocket chain industries; **Myron L. Buck**, Cleveland, for the rolling steel door, and the upward-acting door industries; **Lester A. Coons**, New York, for the copper and brass mill products industry.

Tack and Staple: The NIRB has approved an application of the code authority for the cut tack, wire tack and small staple manufacturing industry to stay the operation of Article VII, of the code, providing for price filing, until June 16, 1935.

Printing Equipment and Machinery: The NIRB has approved the method of value determination and rules and regulations covering trade-in allowances for used and second-hand machinery under the code of fair competition for the printing equipment industry and trade. The plan permits each manufacturer to file with the code authority, maximum trade-in allowance he considers appropriate for machinery of his own manufacture. Allowances may be refiled within 60 days. The code authority is required to furnish trade-in allowances lists to any member upon written application, and make such lists available for any industry member or prospective purchaser. At any time upon complaint, or on its own initiative, the board may suspend the plan for 30 days in order to give time for an investigation of its working. The regulations become effective May 9 unless good cause to the contrary is shown.

Industrial Supplies and Machinery Distributors: The NIRB has approved an amendment to the code for the industrial supplies and machinery distributors trade providing that the code authority for the trade shall submit to the board a list of hazardous occupations within 30 days after approval of the amendment, or by May 17. The amendment is effective May 2, unless good cause to the contrary is shown.

Hack Saw Blade: The Code Authority for the hack saw blade manufacturing industry has applied for approval of an amendment providing for a voluntary liquidated damages enforcement method.

Code Authorities Approved

The NRA has announced recognition of the following code authority members:

Hoist Builders Industry: G. W. Burrell, Wellman Engineering Co., Cleveland; J. W. Neasham, Ottumwa Iron Works, Ottumwa, Iowa; E. L. Pearce, Lake Shore Engine Works, Marquette, Mich.; Robert E. Friend, Nordberg Mfg. Co., Milwaukee; S. T. Nicholson, Vulcan Iron Works, Wilkes-Barre, Pa.; Herman Schifflin, Allis-Chalmers Mfg. Co., Milwaukee.

Unit Heater and/or Unit Ventilator Manufacturing Industry: G. E. Otis, Herman Nelson Corpn., Moline, Ill.; J. F. G. Miller, B. F. Sturtevant Co., Hyde Park, Mass.; A. G. Dixon, Modine Mfg. Co., Racine, Wis.; R. J. Tenkonohy, Airtherm Mfg. Co., St. Louis.

Foundry Equipment Industry: F. R. Wallace, Tabor Mfg. Co., Philadelphia; R. S. Hammond, Whiting Corpn., Harvey, Ill.; S. C. Vesay, W. W. Sly Mfg. Co., Cleveland; B. C. Trusblood, Arcade Mfg. Co., Freeport, Ill.; O. C. Sabin, Steelblast Abrasives Co., Cleveland; E. O. Beardsley, Beardsley & Piper Co., Chicago; T. W. Pangborn, Pangborn Corpn., Hagerstown, Md.; and D. A. Weber, Deister Concentrator Co., Fort Wayne, Ind., and H. S. Simpson National Engineering, Co., Chicago, Ill.

Job Galvanizing Metal Coating Industry: Phelps Ingersoll, Wilcox Crittenden Co., Middletown, Conn., to succeed the late C. S. Whitney, of Cambridge, Mass.

Industrial Wire Cloth Manufacturing Industry: L. C. Campbell, Newark Wire Cloth Co., Newark, N. J.; G. A. Disbro, W. S. Tyler Co., Cleveland; H. H. Rennell, C. O. Jelliff Mfg. Corpn., Cleveland; F. B. Ungar, Ludlow-Saylor Wire Co., St. Louis; E. G. Hartman, American Wire Fabric Corpn., New York; W. B. Eames, Spargo Wire Co., Rome, N. Y.; and F. G. Gilbert, Chase Brass & Copper Co., New York.

Canning and Packing Machinery and Equipment Industry—Ogden S. Sells, Food Machinery Corpn., San Jose, Cal.; John G. Allbright, Allbright-Nell Co., Chicago; John J. Dupps, Cincinnati Butchers' Supply Corp., Cincinnati; R. A. Sindall, A. K. Robins & Co., Baltimore; Frank D. Chapman, Berline-Chapman Co., Berline, Wis.; Lee W. Duer, Elgin Mfg. Co., Elgin, Ill.; W. E. Nicholoy, Scott Viner Co., Columbus, Ohio; R. T. Randall, Jr., R. T. Randall Co., Philadelphia; and L. J. Menges, Menges-Mange, Inc., St. Louis

Mine Car Manufacturing Industry: Carroll Burton, Lorain Steel Co., Johnstown, Pa.; H. H. Watt, Watt Car & Wheel Co., Barnesville, Ohio; C. E. Parks, Kanawha Mfg. Co., Charleston, W. Va.; J. L. McDowell, American Car & Foundry Co., New York; J. Milton Duff, Phillips Mine & Mill Supply Co., Pittsburgh; B. F. Faunce, Brown-Fayro Co., Johnstown, Pa.; and W. F. Daniel, Enterprise Wheel & Car Corpn., Bristol, Va.-Tenn.

Scrap Iron and Steel Trade: Darwin S. Luntz, Luntz Iron & Steel Co., Canton, Ohio; Louis J. Borinstein, 201 South East Street, Indianapolis; Joseph V. Kiley, T. J. Kiley & Son, Boston; Harry Grant, Grant Iron & Metal Co., Detroit; and B. H. Rubine, Hudson Iron & Metal Co., Bayonne, N. J.

The Machine Tool and Equipment Distributing Trade: Marshall Prentiss, Henry Prentiss & Co., Inc., New York; Stanley Motch, Motch & Merryweather Machinery Co., Cleveland; J. Roy Porter, Marshall & Huschart Machinery Co., Chicago; J. W. Wright, Colcord-Wright Machinery & Supply Co., St. Louis; C. E. Moore, Herberts-Moore Machinery Co., San Francisco; C. T. Bush, Chas. A. Strelinger Co., Detroit; N. P. Lloyd, Lloyd & Arms, Inc., Philadelphia.

Metal Window Industry: G. J. Meyer, Truscon Steel Co., Youngstown; Guy D. Bayley, William Bayley Co., Springfield, Ohio; Frank Garratt, Hope's Windows, Inc., Jamestown, N. Y.; F. A. Mesker, Mesker Bros. Iron Co., St. Louis; C. J. McIntosh, Federal Steel Sash Co., Waukesha, Wis.; and C. R. Raquet, Detroit Steel Products Co., Detroit.

Price Waiting Period "Inadvisable," Says NRA—Output Control Opposed

WASHINGTON, April 23.—The NRA today announced a new policy on open price filing. Though otherwise vague and difficult of interpretation, the nine-page statement makes it clear that the open price filing will be continued in industries where it is now effective, but the waiting period, now allowable, is held to be generally inadvisable. There will be cases where the waiting period will be continued, but broadly it will be done away with.

The new policy also opposes restriction of output, except in so-called cases of emergency or destructive price competition. In a few industries, it is stated, in which competition has proved unusually disorderly, it may be necessary to intervene to bring production into line with demand. But such intervention, it is added, should avoid "restriction of output" and "should aim at the kind of equation between production and consumption as the market is supposed to effect."

The latter phrase is interpreted as meaning where prices have become destructive the NRA will intervene and bring about restriction of output, not by actual restricting of physical capacity, but by lifting prices to a reasonable level. The strategy of police, NRA said, must find expression in a multitude of decisions.

The statement proceeds to say that the end is single, "an economy, not of scarcity, but of plenty." The goal sought is declared to be the establishment of conditions under which a free and open market competition may determine a fair price.

Speculation has been made to what effect this may mean in the way of elimination of provisions from codes which bar new construction, including the iron and steel code. The code now bars new construction of blast furnace, Bessemer converter and open-hearth capacity unless it is permitted by the Administration and the code authority.

The change in policy, of course, is dependent upon action of Congress with respect to NRA legislation. However, the plan is to effectuate the new policy at once, subject to changes that may be necessary through Congressional action in extending NRA.

Cast Iron Pipe

Metropolitan District, Boston, has awarded 1440 tons of 20-in. and specials to Donaldson Iron Co. and United States Pipe & Foundry Co. on a 50-50 per cent basis.

Wolfeboro, N. H., has closed bids on 22,000 ft. of 8-in. and 650 ft. of 6-in.

Augusta Water District, Augusta, Me., has tentative plans for a round tonnage of 10-in. pipe.

Savoy, Tex., will ask bids early in May for pipe for water system; also for elevated steel tank on 100-ft. steel tower and other waterworks equipment.

Perry, Mo., closes bids May 3 for pipe for water system; also for elevated tank and tower, pumping plant and other waterworks construction. Cost about $51,000. W. B. Rollins & Co., Railway Exchange Building, Kansas City, Mo., are consulting engineers.

Sterling, Mass., asks bids until April 30 for about four miles 6, 8 and 10-in. for water system, 250,000-gal. steel standpipe, pumping machinery and accessories and other waterworks construction. Fay, Spofford & Thorndike, 44 School Street, Boston, are consulting engineers.

North Sacramento, Cal., plans water pipe lines. Financing for $132,000 is being arranged for this and other waterworks construction.

General Purchasing Officer, Panama Canal, Washington, closes bids May 8 for 3500 ft. of 2 and 4-in. soil pipe and fittings (Schedule 3050).

Toccoa, Ga., plans water pipe lines; also other waterworks extensions and improvements, including storage tank. Bond issue of $39,000 has been authorized. E. P. Bridges is city manager.

Ravenna, Ohio, will take bids early in May for water pipe. Fund of $40,000 is being arranged.

Wentzville, Mo., will soon take bids for pipe for water system; also for water softener plant and waterworks equipment. Russell & Axon, 4903 Delmar Boulevard, St. Louis, are consulting engineers.

City of Louisiana, Mo., will open bids May 1 for water supply and purification plant. Cost about $75,000. W. A. Fuller Co., St. Louis, is engineer.

Department of Public Works, City Hall, Milwaukee, closes bids May 2 for mixing equipment and basin drainage pumps for installation in coagulation basins of new $4,750,000 municipal water filtration plant. Roland E. Stoelting is commissioner of public works.

Village of Fox Point (Milwaukee P. O.), Wis., closes bids May 9 for 12,250 ft. of 16-in. for connection with Milwaukee waterworks. C. S. Whitney is engineer.

Fond du Lac, Wis., asks bids until April 30 for water pipe. W. A. Coffman is city clerk.

Stringtown, Okla., plans pipe lines for water system; also pumping machinery and other waterworks equipment. Fund of $40,000 is being arranged for this and sewage system. W. B. McMasters, Oklahoma City, Okla., is consulting engineer.

Burnet, Tex., closes bids May 2 for 8000 ft. of 6 and 8-in.; also for smaller galvanized pipe, about 9000 lb. of pipe fittings, elevated steel tank and tower and other waterworks equipment. Fund of $46,000 has been arranged. J. W. Beretta Engineers, Inc., National Bank of Commerce Building, San Antonio, Tex., is consulting engineer.

Los Angeles will take bids April 26 on 3946 tons of 6, 8 and 12-in., with delivery during third quarter.

East Bay Municipal Utility District will take bids May 2 at Oakland, Cal., for 552 to 584 tons of 6 to 12-in.

Heppner, Ore., will take bids May 6 on three miles of 8-in., about 300 tons, with alternates on steel pipe.

Railroad Equipment

Canadian Dominion Government legislature has guaranteed equipment securities of the Canadian National and Canadian Pacific to an amount of $15,000,000 for new railroad equipment and repairs.

Canadian National will scrap 200 locomotives, 11,682 freight cars, 570 passenger cars and 4440 units of work equipment.

National Railways of Mexico have ordered five locomotives from Baldwin Locomotive Works.

St. Louis-San Francisco will rebuild 750 wooden box cars into steel cars in its Springfield, Mo., shops.

Grand Trunk may purchase 150 gondola cars.

RAILS

Erie has applied to Interstate Commerce Commission for authority to borrow $1,000,000 from PWA to finance purchase of 17,850 tons of rails and track material, latter to include 3018 kegs of track spikes, 284,397 tie plates, 25,353 joint bars, 541 lag screws and 186,222 rail anchors.

Unemployment Lower During March

THE total number of unemployed workers in March, 1935, was 9,760,000, according to the regular monthly estimate of the National Industrial Conference Board. This is a decrease of 125,000, or 1.3 per cent, from the preceding month, but an increase of 366,000, or 3.9 per cent over March, 1934.

From February to March, 1935, the decreases in unemployment, by industrial groups, were: manufacturing and mechanical industries, 164,000; transportation, 12,000; miscellaneous industries, 4000; and domestic and personal service, 1000. Unemployment in trade showed an increase of 16,000; and in mining, 14,000.

The Bureau of Supplies and Accounts, Navy Department, will open bids, May 10, on 120 tons of galvanized steel plates for stock at navy yards, as follows: Boston, 30 tons; Norfolk, 45 tons; Mare Island, 15 tons, and Puget Sound, 30 tons.

Current Metal Working Activity Statistically Shown

These Data Are Assembled By THE IRON AGE From Recognized Sources And Are Changed Regularly As More Recent Figures Are Made Available. Boldface Type Indicates Changes This Week

Raw Materials:	March, 1935	February, 1935	March, 1934	Three Months, 1935	Three Months, 1934
Lake ore consumption (gross tons)[a]	**2,582,968**	2,467,269	2,189,566	7,319,780	5,573,615
Coke production (net tons)[b]	.....	2,873,432	3,129,973	.....	8,336,252
Pig Iron:					
Pig iron output—monthly (gross tons)[c]	1,777,028	1,608,552	1,619,534	4,862,916	4,098,433
Pig iron output—daily (gross tons)[a]	57,098	57,448	52,243	54,032	45,381
Castings:					
Malleable castings—production (net tons)[d]	.....	41,377	43,438	.....	107,794
Malleable castings—orders (net tons)[d]	.....	41,225	42,961	.....	112,056
Steel castings—production (net tons)[d]	.....	29,687	39,491	.....	95,661
Steel castings—orders (net tons)[d]	.....	31,725	60,046	.....	122,040
Steel Ingots:					
Steel ingot production—monthly (gross tons)[a]	2,830,700	2,742,125	2,761,438	8,406,995	6,915,785
Steel ingot production—daily (gross tons)[a]	108,873	114,255	102,275	109,182	88,664
Steel ingot production—per cent of capacity[a]	49.18	51.61	46.45	49.32	40.27
Employment in Steel Industry:					
Total employees[a]	.....	420,397	419,277	.....	405,196
Total payrolls (thousands of dollars)[a]	.....	44,213	41,263	.....	112,566
Average hours worked per week[a]	.....	35.6	33.9	.....	32.4
Finished Steel:					
Trackwork shipments (net tons)[a]	.....	2,892	4,446	.....	10,597
Sheet steel sales—(net tons)[e]	**193,057**	184,355	158,244	698,210	552,062
Sheet steel production (net tons)[e]	**227,082**	219,062	220,282	681,858	578,734
Fabricated shape orders (net tons)[g]	.....	70,980	105,537	.....	272,425
Fabricated shape shipments (net tons)[g]	.....	65,430	65,728	.....	170,860
Fabricated plate orders (net tons)[d]	.....	15,064	38,924	.....	69,462
Reinforcing bar awards (net tons)[a]	17,335	22,265	19,300	55,200	51,300
U. S. Steel Corpn. shipments (tons)[h]	668,056	583,137	588,209	1,785,348	1,305,486
Ohio River Steel Shipments[hh]	**75,072**	64,369	47,897	192,097	106,379
Fabricated Products:					
Automobile production U. S. and Canada[dd]	**451,805**	358,658	345,443	1,113,835	749,532
Construction contracts (37 Eastern States)[i]	$123,043,500	$75,047,400	$178,345,800	$297,864,500	$461,525,800
Steel barrel shipments (number)[d]	.....	402,928	703,101	.....	1,982,362
Steel furniture shipments[d]	.....	$1,064,219	$955,633	.....	$2,846,547
Steel boiler orders (sq. ft.)[d]	.....	281,646	375,774	.....	838,643
Locomotive orders (number)[k]	8	1	3	9	23
Freight car orders (number)[k]	0	806	522	830	20,899
Machine tool index[l]	62.3	53.0	48.1	†60.3	†50.9
Foundry equipment index[ll]	**69.3**	75.7	75.4	†77.2	†59.5
Foreign Trade:					
Imports of pig iron (gross tons)[m]	.....	10,741	20,674	.....	43,337
Imports of rolled steel (gross tons)[m]	.....	11,024	6,822	.....	20,461
Exports of all rolled steel and iron (gross tons)[m]	.....	63,739	87,916	.....	253,309
Exports, finished steel (gross tons)[m]	.....	59,147	79,854	.....	227,394
Exports of scrap (gross tons)[m]	.....	156,332	173,165	.....	336,321
British Production:					
British pig iron production (gross tons)[n]	553,200	483,100	503,600	1,557,500	1,359,300
British steel ingot production (gross tons)[n]	841,900	769,500	834,500	2,369,200	2,253,000
Non-Ferrous:					
Lead production (net tons)[a]	.....	27,398	35,502	.....	108,421
Lead shipments (net tons)[a]	.....	32,518	30,321	.....	90,010
Zinc production (net tons)[p]	36,216	33,072	33,845	104,902	97,218
Zinc shipments (net tons)[p]	41,137	34,903	32,877	111,578	92,018
Deliveries of tin (gross tons)[r]	5,495	3,905	3,835	14,000	10,085

[a]Preliminary. †Three Months' Average.

Sources of figures: [a] Lake Superior Iron Ore Association; [b] Bureau of Mines; [c] THE IRON AGE; [d] Bureau of the Census; [dd] When preliminary, from Automobile Manufacturers' Association—Final figures from Bureau of the Census; [e] American Iron and Steel Institute; [f] National Association of Flat-Rolled Steel Manufacturers; [g] American Institute of Steel Construction; [h] United States Steel Corpn.; [hh] U. S. Engineer, Pittsburgh; [i] F. W. Dodge Corpn.; [k] *Railway Age;* [l] National Machine Tool Builders Association; [ll] Foundry Equipment Manufacturers Association; [m] Department of Commerce; [n] British Iron and Steel Federation; [o] American Bureau of Metal Statistics; [p] American Zinc Institute, Inc.; [r] New York Commodities Exchange.

Steel Ingot Output Registers Another Increase

Gains at Chicago and Youngstown Raise National Average to 47 Per Cent; Miscellaneous Demands Grow; Scrap Composite Dips

GROWING diversification of demand has raised steel production for the second consecutive week. Ingot output, at 47 per cent of capacity, is one-half point higher than last week and a full point higher than two weeks ago. Among the leading producing centers Chicago registered a gain of three and one-half points to 53½ per cent and the Valley average rose one point to 56 per cent, while operations elsewhere remained substantially unchanged.

AUTOMOTIVE demand is holding at recent rates, even showing a slight gain in the Chicago district, while tin plate output remains unchanged at the high rate of 85 per cent of capacity. Rail rollings are helping output at Chicago and Birmingham, and the arrival of favorable weather has stimulated the flow of steel into construction work. Here and there material is being accumulated by buyers because of lingering fears of inflation, stocking of both pig iron and sheets being reported in the Chicago district. But it is upon the slowly expanding demand from miscellaneous sources that steel producers base their hopes for sustained operations. Only a month ago the trade feared a drastic slump by late April or early May, but today it is conceded that general business has gathered real momentum and may succeed in forging ahead despite the drag of political and economic uncertainties.

IF present hopes are not fulfilled, the expected downswing in production will merely be delayed instead of prevented, since automotive demands are due to decline before long and the full effects of the latest public works appropriation will probably not be felt for several months.

Automobile output, though undiminished, is headed for a gradual recession in May and June, and motor car makers are already beginning to pare inventories. Substantial tonnages of automotive steel will continue to be purchased, but the volume will be on a diminishing scale.

THE scrap composite, which is an average of heavy melting steel prices at Pittsburgh, Chicago and Philadelphia, has receded from $10.42 to $10.33 a ton because of a 25c. decline in the last-named center. However, scrap markets in general are steady with scattered evidences of strength, and steel scrap at Cleveland, which is not included in THE IRON AGE scrap index, has advanced 50c. a ton.

Confusion regarding the freight surcharges will probably be of only temporary duration. The new tariffs were filed to become effective on five days' notice as against a statutory provision for 30 days' notice. Thus far only eight States have permitted the surcharges to go into effect on intrastate traffic, but most other States are expected to approve them with the expiration of the prescribed waiting period. Meanwhile buyers located in the same States with basing points are able to escape payment of surcharges.

CAN manufacturers experienced the heaviest business volume in their history in the first three months of this year. The old market for 5-gal. oil cans, which they lost when service stations came into vogue, is being more than recovered with the growing popularity of sealed quart oil cans.

Road equipment makers are taking more steel, and tractor manufacturers, already pressed by the demand for new machines, are now getting urgent calls for repair parts from dust storm areas.

Structural steel awards of 9350 tons compare with 32,025 tons a week ago. Lettings of sheet steel piling, at 8050 tons, include 7000 tons for an Army base at Boston. Reinforcing steel contracts total 7200 tons, of which 6200 tons is for a Chicago sewage treatment plant.

The Erie's track requirements have been revised upward to 17,851 tons of rails and 5235 tons of accessories. The Grand Trunk plans the replacement of 50 miles of track with heavier sections, and has entered the market for 150 gondola cars. The Burlington has bought 5000 tons of steel for 500 gondola cars which it will build in its own shops.

Los Angeles takes bids this week on 4000 tons of cast iron pipe. Some pipe producers have advanced prices $1 a ton.

THE IRON AGE composites for finished steel and pig iron are unchanged at 2.124c. a lb. and $17.90 a ton respectively.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

Per Gross Ton:	Apr. 23, 1935	Apr. 16, 1935	Mar. 26, 1935	Apr. 24, 1934
No. 2 fdy., Philadelphia	$20.26	$20.26	$20.26	$20.26
No. 2, Valley furnace	18.50	18.50	18.50	18.50
No. 2 Southern, Cin'ti	19.13	19.13	19.13	18.13
No. 2, Birmingham†	14.50	14.50	14.50	13.50
No. 2 foundry, Chicago*	18.50	18.50	18.50	18.50
Basic, del'd eastern Pa	19.76	19.76	19.76	19.76
Basic, Valley furnace	18.00	18.00	18.00	18.00
Valley Bessemer, del'd P'gh	20.76	20.76	20.76	20.76
Malleable, Chicago*	18.50	18.50	18.50	18.50
Malleable, Valley	18.50	18.50	18.50	18.50
L. S. charcoal, Chicago	**24.2528**	24.04	24.04	24.04
Ferromanganese, seab'd carlots	85.00	85.00	85.00	85.00

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivered quotations from nearest Northern furnace.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Rails, Billets, etc.

Per Gross Ton:				
Rails, heavy, at mill	$36.37½	$36.37½	$36.37½	$36.37½
Light rails, Pittsburgh	35.00	35.00	35.00	35.00
Rerolling billets, Pittsburgh	27.00	27.00	27.00	29.00
Sheet bars, Pittsburgh	28.00	28.00	28.00	30.00
Slabs, Pittsburgh	27.00	27.00	27.00	29.00
Forging billets, Pittsburgh	32.00	32.00	32.00	34.00
Wire rods, Pittsburgh	38.00	38.00	38.00	38.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.70	1.70	1.70	1.70

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.80	1.80	1.80	1.90
Bars, Chicago	1.85	1.85	1.85	1.95
Bars, Cleveland	1.85	1.85	1.85	1.95
Bars, New York	**2.15**	2.13	2.13	2.23
Plates, Pittsburgh	1.80	1.80	1.80	1.85
Plates, Chicago	1.85	1.85	1.85	1.90
Plates, New York	**2.0926**	2.08	2.08	2.13
Structural shapes, Pittsburgh	1.80	1.80	1.80	1.85
Structural shapes, Chicago	1.85	1.85	1.85	1.90
Structural shapes, New York	**2.063175**	2.05¼	2.05¼	2.10¼
Cold-finished bars, Pittsburgh	1.95	1.95	2.10	2.10
Hot-rolled strips, Pittsburgh	1.85	1.85	1.85	2.00
Cold-rolled strips, Pittsburgh	2.60	2.60	2.60	2.80

Finished Steel

Per Lb.:	Apr. 23, 1935 Cents	Apr. 16, 1935 Cents	Mar. 26, 1935 Cents	Apr. 24, 1934 Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.40	2.40	2.40	2.65
Hot-rolled annealed sheets, No. 24, Gary	2.50	2.50	2.50	2.75
Sheets, galv., No. 24, P'gh	3.10	3.10	3.10	3.25
Sheets, galv., No. 24, Gary	3.20	3.20	3.20	3.35
Hot-rolled sheets, No. 10, P'gh	1.85	1.85	1.85	2.00
Hot-rolled sheets, No. 10 Gary	1.95	1.95	1.95	2.10
Wire nails, Pittsburgh	2.60	2.60	2.60	2.60
Wire nails, Chicago dist. mill	2.65	2.65	2.65	2.65
Plain wire, Pittsburgh	2.30	2.30	2.30	2.30
Plain wire, Chicago dist. mill	2.35	2.35	2.35	2.35
Barbed wire, galv., P'gh	3.00	3.00	3.00	3.00
Barbed wire, galv., Chicago dist. mill	3.05	3.05	3.05	3.05
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.25

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	$11.50	$11.50	$11.75	$14.00
Heavy melting steel, Phila	9.75	10.00	10.25	11.50
Heavy melting steel, Ch'go	9.75	9.75	10.25	11.75
Carwheels, Chicago	10.50	10.50	10.50	11.75
Carwheels, Philadelphia	11.25	11.25	11.75	13.00
No. 1 cast, Pittsburgh	12.25	12.25	12.25	13.75
No. 1 cast, Philadelphia	11.00	11.00	11.00	13.00
No. 1 cast, Ch'go (net ton)	9.00	9.00	9.00	9.50
No. 1 RR. wrot., Phila	10.75	10.75	10.75	12.50
No. 1 RR. wrot., Ch'go (net)	8.00	8.00	8.00	9.50

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$3.85	$3.85	$3.85	$3.85
Foundry coke, prompt	4.60	4.60	4.60	4.60

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, refinery‡	8.75	8.75	8.75	8.25
Lake copper, New York‡	9.12½	9.12½	9.12½	8.50
Tin (Straits), New York	*50.62½*	51.12½	47.45	55.90
Zinc, East St. Louis	**4.10**	4.07½	3.90	4.37½
Zinc, New York	**4.45**	4.42½	4.25	4.72½
Lead, St. Louis	**3.60**	3.55	3.45	4.10
Lead, New York	**3.75**	3.70	3.60	4.25
Antimony (Asiatic), N. Y.	14.25	14.25	14.50	7.95

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables. ‡Blue Eagle copper.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
April 23, 1935	2.124c. a Lb.	$17.90 a Gross Ton	$10.33 a Gross Ton
One week ago	2.124c.	17.90	10.42
One month ago	2.124c.	17.90	10.75
One year ago	2.199c.	17.57	12.42
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products make 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel HIGH	Finished Steel LOW	Pig Iron HIGH	Pig Iron LOW	Steel Scrap HIGH	Steel Scrap LOW
1935	2.124c., Jan. 8	2.124c., Jan. 8	$17.90, Jan. 8	$17.90, Jan. 8	$12.33, Jan. 8	$10.33, April 23
1934	2.199c., April 24	2.008c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	2.015c., Oct. 3	1.867c., April 18	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.42, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

Demand Is Sustained In Pittsburgh District

Miscellaneous Steel Orders Give Strong Support to Mill Schedules—Valley Operations Up One Point

PITTSBURGH, April 23.—Despite the absence of any important favorable developments during the past week, the local steel industry is managing to maintain its recent pace of activity. New business from the automotive industry is not coming in fast enough to offset declining backlogs of flat-rolled products and hot-rolled bars, but the belief still is prevalent that steel inventories at automotive centers will soon bear replenishment on an important scale.

Miscellaneous steel orders representing largely spot tonnage are playing an important part in current mill schedules, and the surprisingly steady flow of such business is sustaining hopes for a fair operating record this spring.

A better general demand for steel entering into road-making equipment and also for road and bridge construction is in the making and should crystallize into orders soon after machinery is set up for spending the latest Federal relief money. Plans for many State and local public projects, which have been temporarily deferred until local authorities can ascertain what share of the relief money can be obtained, are expected soon to pass out of the blue print stage, and the release of such work is expected to be a sustaining influence to steel activity later on.

Application of the emergency freight surcharges to interstate shipments of steel products has not had a great deal of bearing on the steel market. On shipments within Pennsylvania the surcharges are not being applied, and in instances where Pittsburgh steel producers are obliged to meet competition in neighboring States, the producers are absorbing the surcharges.

Considerable confusion persists on the subject of freight surcharges, which probably will not be entirely clarified until State transportation commissions state their findings, after hearings relating to intrastate freight.

Steel ingot output in the Pittsburgh district for the sixth consecutive week is steady at 35 per cent. Production in the Valleys and nearby northern Ohio mills is up one point to 56 per cent. Activity in the Wheeling district is unchanged at 77 per cent.

Pig Iron

Gray iron and steel foundries are busier, and the generally heavier melting schedules are being reflected in an encouraging pickup in small lot shipments of pig iron. Steel mill equipment makers are remaining out of the open market, but still are accounting for heavy consumption in this district. Movement of pig iron for ingot mold manufacture is only fair.

Semi-Finished Steel

Sheet bar shipments to detached tin plate mills are still in large volume, though the aggregate movement is diminishing slightly. Non-integrated sheet and strip mills also are taking a fairly heavy share of semi-finished steel, and so long as finishing mill schedules are sustained at the present rate semi-finished demand should be maintained, as few mills have unusually heavy supplies on hand. Demand for skelp is in moderate volume, while wire rods are enjoying a seasonal pickup. Forging stock is still favorably affected by sustained activity in the automotive industry.

Bolts, Nuts and Rivets

Demand has failed to gain since the beginning of second quarter, and all classes of buyers are covering sparingly. Despite the apathetic tone of the market, the higher prices established on April 1 appear to be holding.

Rails and Track Accessories

Purchases of miscellaneous items required for track maintenance and repair work are bringing small tonnages to local mills. Prospects for further important rail and accessory buying by the carriers rest almost entirely upon the providing of financial aid. A good deal of relocating of tracks, incidental to lock and dam construction along rivers in this area, will create a minor demand for new material.

Reinforcing Steel

Small shipments spurted prior to the establishment of the I.C.C. emergency freight charge. The market at present is sluggish and lacks prospects for early improvement either from public or private work. Many State and local projects have been temporarily shelved until Federal relief works money is released, when sponsors for the bulk of current pending projects are expected to obtain financial support from Federal allocations. Private capital, in the face of heavy Government spending, remains in hiding.

Cold-Finished Bars

Orders are appearing more frequently, with automobile and farm implement makers ordering the greatest share of current tonnage. The $3 a ton reduction, which became effective on April 11, has attracted a better volume of business from the jobbing trade. Miscellaneous bookings also have maintained recent gains. Talk of adjustments in extras and in the spread between the hot-rolled bar and cold-finished bar prices has not subsided, but any early changes in the present set-up are not expected.

Plates and Shapes

The structural market is livelier, with awards reported here for the past week in good volume. Another encouraging feature is the appearance of several lettings for private work on the list. New specifications, however, are not keeping pace with awards. At Pittsburgh, 300 tons is specified for an addition to International Furniture Co. building.

Plates are in better demand for barge construction. About 900 tons is specified for 60 dredge pontoons, for which bids are being taken by the United States Engineer's Office at Vicksburg, until April 26. Little interest is being displayed by railroad equipment makers and tank erectors.

Tubular Products

Demand for most classes of tubing is on an even keel. The steady movement of oil country goods is the most encouraging feature at present, although drilling has not increased in accordance with plans earlier this year. Orders for seamless commercial boiler and locomotive tubes are playing a minor part in current mill schedules. Electric welded mechanical tubing is enjoying the lion's share of automotive business. Prospects for a heavier

movement of seamless mechanical tubing for automotive consumption have brightened with the announcement of a new type of truck design calling for a full-floated type of axle.

Bars

Scattered increases in automotive covering are reported, but bar producers in this district have not yet experienced any genuine pick-up in automotive specifications. Heavier tonnage is being booked for farm implement manufacture, which is considered quite encouraging in the face of adverse conditions in certain Mid-Western areas. Miscellaneous tonnage is unusually steady.

Wire Products

Wire mill schedules in this district are heavier as a result of a fairly satisfactory flow of seasonal business. Demand for merchant items, however, is behind the general trend in this market. Support is offered notably by the automotive industry, which is taking a steady volume of manufacturers' wire. Demand from furniture and bed spring makers is extremely light.

Sheets

Although lower bookings of automotive items in the past week accounted for a slight decline in aggregate sheet tonnage, sellers in this district were encouraged by the unusually well diversified calls for miscellaneous material. Demand is opening up from makers of road building equipment. Sheet production this week is expected to hold at 65 to 70 per cent.

Tin Plate

Most producers report a satisfactory influx of fresh specifications against contracts. In one or two instances, packers are specifying more cautiously, but the general tendency among consumers is to place specifications with freedom in anticipation of a favorable crop season. Most tin plate mills are operating on meager backlogs, but a considerable amount of contract tonnage not yet specified is expected to sustain schedules well toward the end of the second quarter. In the current week, a slightly heavier production at the leading producers' mills is offsetting minor recessions in other directions, and production will be sustained at around 85 per cent.

Strip Steel

Shipments are gaining moderately, and specifications are appearing in sufficient volume to maintain moderate backlogs. The automotive industry continues to lead in the current movement, with miscellaneous consumers only a step behind. Hot-rolled strip production is holding at around 50 per cent, while cold-rolled output is averaging about 55 per cent. An independent producer in this district expects soon to go into production on a new mill.

Coke and Coal

Demand for bituminous coal and furnace and foundry coke lacks snap. The Lake movement is particularly disappointing, although rather substantial shipments were made prior to the threatened bituminous strike on April 1. Small spot shipments of foundry coke are slightly heavier. Shippers of coal and coke are permitted by code authority to absorb the emergency freight surcharge on interstate freight traffic by reducing the price of fuel not more than 15c. a ton.

Scrap

A steel mill in this district purchased within the past week a moderate tonnage of No. 1 heavy melting steel at $11.25, delivered. Orders taken at that price have not thus far proved profitable, as small yard dealers are rather reluctant to release heavy melting steel at below $11.50, which is being offered by several brokers to cover old orders booked at this figure or at higher prices. The $11.25 sale is not therefore considered entirely indicative of the general market in this district. On the other hand, it is difficult to uncover any basis for claims of a stronger market except in trade sentiment. A comparatively small tonnage of machine shop turnings was sold recently at $7.75, delivered. No. 2 heavy melting steel is weaker. Railroad specialties are in good demand for mill equipment makers. But dealers apparently are not inclined to meet current offering prices at around $14, claiming that they are unable to sell profitably at less than $14.50, delivered.

Large Grade Separation Program at St. Louis

ST. LOUIS, April 23.—Southern pig iron apparently was the only commodity in the iron and steel trade in which shipments were accelerated because of the emergency freight rate which became effective last Thursday. One seller reported that its shipments for the first half of April exceeded those for the whole month of March. The increase applying to finished iron and steel products was said not to be sufficient to encourage users to buy more than their needs, especially in view of uncertainty as to the future of the NIRA.

The Granite City Steel Co. reports that its business for the first quarter of 1935 showed a substantial increase over the same period a year ago.

The City of St. Louis is contemplating various grade-crossing eliminations, which will require approximately 4750 tons of structural steel, although the plans have not been approved. The Mississippi Valley Structural Steel Co. has been awarded 170 tons of structural steel for a parts warehouse for the Chevrolet Motor Co. here, and the St. Louis Structural Steel Co. has been given 178 tons for a highway bridge in St. Clair County, Ill.

The scrap market continues weak because of a lack of buying. Prices are nominally unchanged.

Reinforcing Steel

Awards 7200 Tons—New Projects 4600 Tons

AWARDS

Boston, 450 tons, parcel post building, to Truscon Steel Co.

Boston, 100 tons, Army base, to Kalman Steel Corpn.

Chicago, 6200 tons, Stickney Sanitary District project, to Inland Steel Co.

State of Illinois, 100 tons, road work, to Concrete Engineering Co.

Utica, N. Y., 200 tons, grade crossing elimination, to Joseph T. Ryerson & Son, Inc.

Thurston County, Wash., 118 tons, State crossing, to an unnamed bidder.

NEW REINFORCING BAR PROJECTS

Racine, Wis., 150 tons, filter plant.

Waukegan, Ill., 1000 tons, sewage disposal plant.

Columbus, Ohio, 500 tons, Main Street bridge; bids May 9.

Beach City, Ohio, 100 tons, relocating tracks of Baltimore & Ohio Railroad in connection with Muskingum District conservation project; bids to be taken by United States Engineer, Zanesville, Ohio, May 7.

Zanesville, Ohio, 600 tons, Pleasant Hill Dam, Ashland County, in connection with Muskingum District conservation project; bids to be taken by United States Engineer, about June 11.

Cleveland, 1037 tons, Federal housing project; previously estimated at 700 tons. Date of bidding extended until May 1.

Nampa, Idaho, 156 tons, State subway on Eleventh Avenue; bids open.

San Francisco, 100 tons, girls' high school; bids open.

San Francisco, 3033 tons, Trans-Bay bridge distribution structure; Barrett & Hilp low bidders on general contract.

Spokane, Wash., 175 tons, bins for Spokane-Portland Cement Co.; general contract awarded.

Everett, Wash., 1000 tons, mill for Weyerhaeuser Timber Co.; bids open.

Denver, 450 tons, Cherry Creek retarding dam; bids May 1.

Chicago Rate Rises To 53½ Per Cent

More Rail and Structural Tonnage Being Rolled—Automotive Releases Increase—Some Stocking of Pig Iron and Sheets—Scrap Has Stronger Tone

CHICAGO, April 23.—Slightly better schedules at rail mills and a broadening of steel demand in various other directions have raised ingot output to 53½ per cent of capacity, or a gain of 3½ points.

More steel is moving to reinforcing bar jobs, and structural shops are calling for larger quantities. Tractor plants are getting urgent calls for repair parts, a condition that results from damage caused by Western dust storms. Automobile plants, though taking tonnage in rather close step with requirements, are actually taking more steel than at the turn of the month.

Here and there is the suggestion that consumers are thinking as much in terms of stocks as in terms of needs from day to day. This is particularly noticeable in sheets and among small users who have rounded stocks and are now less active in making purchases. There is also some disposition to store pig iron, though this movement is far less active than it was prior to the advance in freight rates.

Higher railroad charges are limiting the area from which Chicago is drawing scrap. There is already the suggestion that local supplies are not any too plentiful and dealers are offering higher prices for quick shipments.

Pig Iron

Shipments are moderately lower, following a pick-up that preceded the advance in freight rates. At the same time every indication points to a betterment in the melt which dropped in the latter part of March. Shippers of ferroalloys, with the exception of ferromanganese, are absorbing the added freight rates. In the case of low phosphorous pig iron the advance is being passed on to consumers. A number of users of pig iron and specialties are showing a disposition to increase orders, though they know that they must carry part of the extra shipments in stock for use in the third quarter.

Cast Iron Pipe

Some producers are advancing prices $1 a ton and in addition consumers in Chicago must now pay an additional 40c. a ton on freight charges. Quotations on 6-in. and larger pipe in lots of less than 200 tons each range from $39 to $40 a ton, Birmingham, or $47.40 to $48.40 a ton delivered Chicago. The spread between 4-in. pipe and the larger sizes remains at $3 a ton. Awards are light except in small projects. Waukegan, Ill., is sending out plans for a new sewage disposal plant, and Racine, Wis., is preparing to build a filter plant.

Reinforcing Bars

Outstanding in the week's business is an award of 6200 tons to the Inland Steel Co. for the Stickney sewage treating plant at Chicago. Contractors are slowly placing orders for road slab bars, and some new work of this kind is developing in Illinois and Indiana. Wisconsin is preparing to build more overhead crossings, and a large program of similar character is being planned by Illinois. Most fabricators report that the flow of business is steadier and that private work is playing an increasingly important part in the market. Estimating departments are under pressure to meet the demands placed on them.

Wire Products

Producers are preparing to announce fall terms on fencing, a move, according to provisions in the code, which must be made prior to June 1. This situation is tending to check orders from country areas. The miscellaneous manufacturing trade is steady and larger orders are coming from automobile plants, many of which are sustaining production of automobiles above schedules that had been anticipated in the previous buying movement. Politics forms the major check on utility buying, but some business of this character is expected from TVA projects. Illinois and Wisconsin have new overhead crossing plans that will call for sizable quantities of road guards. Reinforcing mesh is moving slowly because old Government appropriations have about run out and new allotments are not due until early in July.

Plates

The Burlington has completed purchases of about 5000 tons of steel for 500 gondola cars which it will build in its own shops. The Grand Trunk is in the market for 150 gondola cars and will undertake an extensive air-conditioning program. All other Western railroads remain quiet as to plans for rolling stock. The National Railways of Mexico have ordered five locomotives. About 1100 tons of plates will be used for tanks ordered on the Pacific Coast, and orders are in prospect for 30 miles of oil line pipe for use in Michigan.

Bars

Tractor plants continue to operate at capacity and builders of this equipment are now being pressed for repair parts which are badly needed in the West where dust storms have played havoc with cylinder liners, bearings, and the like. Automobile manufacturers are holding all gains and the thought is now being expressed that, although April may mark the peak month, May and even the fore part of June will prove to be exceptionally active. Orders for automobile steel are being entered in rather small tonnages but at frequent intervals.

Sheets

Narrowing of the spread between orders and shipments has been halted because of a drop in demand from many miscellaneous users who admit they have taken sheets ahead of requirements and will for a short time rely for the most part on stocks in hand. Major consumers hold steady positions in the market, and output of sheets, both hot and cold rolled, remains close to a dead level.

Rails

A Western railroad has purchased 1300 tons of tie plates, and the Grand Trunk contemplates replacing about 50 miles of main line track with a heavier section. The Erie is seeking permission to buy rails, the exact tonnage being in doubt at this time. Mills are scheduled for four to five weeks.

Structural Material

Fresh inquiries, at about 21,000 tons, are particularly promising.

(CONTINUED ON PAGE 73)

Prices of Finished Steel and Iron Products

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel	*Base per Lb.*
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Gary	1.85c.
F.o.b. Duluth	1.95c.
Del'd Detroit	1.95c.
F.o.b. Cleveland	1.85c.
F.o.b. Buffalo	1.90c.
Del'd Philadelphia	2.09c.
Del'd New York	2.15c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Gary	1.75c.
F.o.b. Moline, Ill.	1.75c.
F.o.b. Cleveland	1.75c.
F.o.b. Buffalo	1.80c.
F.o.b. Birmingham	1.85c.
F.o.b. cars dock Gulf ports	2.10c.
F.o.b. cars dock Pacific ports	2.25c.

Billet Steel Reinforcing

(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh	2.05c.
F.o.b. Chicago	2.10c.
F.o.b. Gary	2.10c.
Del'd Detroit	2.20c.
F.o.b. Cleveland	2.10c.
F.o.b. Youngstown	2.10c.
F.o.b. Buffalo	2.10c.
F.o.b. Birmingham	2.10c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.45c.

Rail Steel Reinforcing

(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago	1.95c.
F.o.b. Gary	1.95c.
F.o.b. Cleveland	1.95c.
F.o.b. Youngstown	1.95c.
F.o.b. Buffalo	1.95c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.30c.

Iron

F.o.b. Chicago	1.80c.
F.o.b. Terre Haute, Ind.	1.75c.
F.o.b. Louisville, Ky.	2.10c.
F.o.b. Dansville, Pa.	1.80c.
F.o.b. Berwick, Pa.	1.70c.

Cold Finished Bars and Shafting*

	Base per Lb.
F.o.b. Pittsburgh	1.95c.
F.o.b. Chicago	2.00c.
F.o.b. Gary	2.00c.
F.o.b. Cleveland	2.00c.
F.o.b. Buffalo	2.05c.
Del'd Detroit	2.15c.
Del'd eastern Michigan	2.20c.

* In quantities of 10,000 to 19,000 lb.

Fence and Sign Posts

Angle Line Posts	*Base per Net Ton*
F.o.b. Pittsburgh	$50.00
F.o.b. Chicago	50.00
F.o.b. Duluth	51.00
F.o.b. Cleveland	50.00
F.o.b. Birmingham	53.00
F.o.b. Houston, Orange, Beaumont, Galveston	59.00
F.o.b. Mobile	58.00
F.o.b. New Orleans, Lake Charles, Corpus Christi	59.00
F.o.b. gars dock Pacific ports	63.00

Plates

	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Gary	1.85c.
Del'd Cleveland	1.99795c.
F.o.b. Coatesville	1.90c.
F.o.b. Sparrows Point	1.90c.
Del'd Philadelphia	1.985c.
Del'd New York	2.0926c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.
Wrought iron plates, f.o.b. P'gh	3.20c.

Floor Plates

F.o.b. Pittsburgh	3.35c.
F.o.b. Chicago	3.40c.
F.o.b. Coatesville	3.45c.
F.o.b. cars dock Gulf ports	3.75c.
F.o.b. cars dock Pacific ports	3.90c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
Del'd Cleveland	1.99795c.
F.o.b. Buffalo	1.90c.
F.o.b. Bethlehem	1.90c.
Del'd Philadelphia	2.005c.
Del'd New York	2.063175c.
F.o.b. Birmingham (standard)	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.15c.
F.o.b. Chicago	2.25c.
F.o.b. Buffalo	2.25c.
F.o.b. cars dock Gulf ports	2.60c.
F.o.b. cars dock Pacific ports	2.60c.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	1.85c.
No. 10, f.o.b. Gary	1.95c.
No. 10, del'd Detroit	2.05c.
No. 10, del'd Phila.	2.14c.
No. 10, f.o.b. Birmingham	2.00c.
No. 10, f.o.b. dock cars Pacific ports	2.40c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.40c.
No. 24, f.o.b. Gary	2.50c.
No. 24, del'd Detroit	2.60c.
No. 24, del'd Phila.	2.69c.
No. 24, f.o.b. Birmingham	2.55c.
No. 24, f.o.b. dock cars Pacific ports	3.05c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.50c.
No. 10 gage, f.o.b. Gary	2.60c.
No. 10 gage, del'd Detroit	2.70c.
No. 10 gage, del'd Phila.	2.79c.
No. 10 gage, f.o.b. Birmingham	2.65c.
No. 10 gage, f.o.b. dock cars Pacific ports	3.10c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	2.95c.
No. 20 gage, f.o.b. Gary	3.05c.
No. 20 gage, del'd Detroit	3.15c.
No. 20 gage, del'd Phila.	3.24c.
No. 20 gage, f.o.b. Birmingham	3.10c.
No. 20 gage, f.o.b. Birmingham	3.25c.
No. 24, f.o.b. dock cars Pacific ports	3.50c.

Galvanized Sheets

No. 24, gage, f.o.b. Pittsburgh	3.10c.
No. 24, f.o.b. Gary	3.20c.
No. 24, del'd Phila.	3.39c.
No. 24, f.o.b. Birmingham	3.25c.
No. 24, f.o.b. dock cars Pacific ports	3.70c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	3.40c.
F.o.b. cars dock Pacific ports	4.10c.

Vitreous Enameling Stock

No. 20, f.o.b Pittsburgh	3.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.75c.
No. 28, Gary	2.85c.
No. 28, cars dock, Pacific Coast ports	3.35c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mill	$5.25
Standard cokes, f.o.b. Gary	5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.90

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ In.

	Base per Lb.
All widths up to 24 in., P'gh	1.85c.
All widths up to 24 in., Chicago	1.95c.
All widths up to 24 in., del'd Detroit	2.05c.
All widths up to 24 in., Birmingham	2.00c.
Cooperage stock, Pittsburgh	2.10c.
Cooperage stock, Chicago	2.20c.

Cold-Rolled Strips

	Base per Lb.
F.o.b. Pittsburgh	2.60c.
F.o.b. Cleveland	2.60c.
Del'd Chicago	2.8926c.
F.o.b. Worcester	2.80c.

Fender Stock

No. 14, Pittsburgh or Cleveland	2.90c.
No. 14, Worcester	3.30c.
No. 20, Pittsburgh or Cleveland	3.30c.
No. 20, Worcester	3.70c.

Hot-Rolled Rail Steel Strips

	Base per Lb.
F.o.b. Pittsburgh	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Birmingham	1.85c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade	*Per Lb.*
Bright wire	2.30c.
Spring wire	2.90c.

Chicago prices on products sold to the manufacturing trade are $1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are $2 a ton above, Birmingham $3 above, and Pacific Coast prices $9 a ton above Pittsburgh or Cleveland.

To Jobbing Trade

Qualified jobbers are entitled to a reduction of 20c. a 100 lb. from the base price on carload shipments to stock, and of 10c. a 100 lb. on less-carload shipments to stock.

	Base per Keg
Standard wire nails	$2.60
Smooth coated nails	2.60
Galvanized nails:	
15 gage and coarser	4.60
16 gage and finer	5.10

	Base per 100 Lb.
Annealed fence wire	$2.45
Galvanized fence wire	2.80
Polished staples	3.30
Galvanized staples	3.55
Barbed wire, galvanized	3.00
Woven wire fence, base column	63.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are $2 a ton over Pittsburgh (except for woven wire fence at Duluth which is $3 over Pittsburgh), and Birmingham mill prices are $3 a ton over Pittsburgh.

On wire nails, barbed wire, staples and fence wire, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are $6 a ton over Pittsburgh, while Pacific Coast prices are $8 over Pittsburgh. Exception: on fence wire Pacific Coast prices are $11 a ton above Pittsburgh.

On staples and barbed wire, prices of $6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

Wire Hoops, Twisted or Welded

	Off List
F.o.b. Pittsburgh	35 and 2½ off
F.o.b. Chicago	35 off

STEEL AND WROUGHT PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio Mills

F.o.b. Pittsburgh only on wrought iron pipe

Butt Weld

Steel Inches	Black	Galv.	*Wrought Iron* Inches	Black	Galv.
⅛	..... 51½	29½	⅛	...+91½	+138
¼ to ⅜	..53½	35	¼ & ⅜		+11½ +21½
½	..58½	47	½	....31½	15
¾	62	52	¾	....36½	20½
1 to 3	64	55	1 & 1¼	39½	25½
			1½	...43½	28
			2	.....41½	26

Lap Weld

2	60	51	2	 37	22½
2½ to 3	..63	54	2½ to 3½	38	25
3½ to 6	..65	56	4 to 8	.. 40	28½
7 and 8	..64	54	9 to 12	...38	24½
9 and 10	..63½	53½			
11 and 12	..62½	52½			

Butt Weld, extra strong, plain ends

¼	.....48½	33½	¼	....+13	+45½
⅜ to ⅝	..51	38	⅜ & ½		+21½ +34½
½	.....56½	47½	⅝	.....32½	17½
¾	61	52	¾	.....37½	22½
1 to 3	63	55	1 to 2	..43½	29

Lap Weld, extra strong, plain ends

2	58	50	2	 40	26
2½ to 3	..62	54	2½ to 4	45½	33
3½ to 6	..65½	57½	4½ to 6	45	33½
7 and 8	..64½	54½	7 & 8	.. 46	33
9 and 10	..63½	53½	9 to 12	. 41½	30
11 and 12	.62½	52½			

On standard steel pipe an extra 5% off is allowed on sales to consumers while two 5's off apply on sales to jobbers. On less-than-carload shipments prices are determined by adding 20 and 25% and the carload freight rate to the base card. On structural steel pipe the base card is reduced 2 points and two 5's off are allowed to consumers and three 5's off to jobbers.

Note—Chicago district mills have a base two points less than the above discounts Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots)

		Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G.	$ 8.60	$7.83
1¼ in. o.d.	13 B.W.G.	10.19	9.26
1½ in. o.d.	13 B.W.G.	11.26	10.23
1¾ in. o.d.	13 B.W.G.	12.81	11.64
2 in. o.d.	13 B.W.G.	14.35	13.04
2¼ in. o.d.	13 B.W.G.	16.00	14.54
2½ in. o.d.	12 B.W.G.	19.29	17.54
2¾ in. o.d.	12 B.W.G.	20.45	18.59
3 in. o.d.	12 B.W.G.	21.45	19.50
4½ in. o.d.	10 B.W.G.	41.08	37.35
3½ in. o.d.	11 B.W.G.	27.00	24.62
4 in. o.d.	10 B.W.G.	33.00	30.54
4½ in. o.d.	10 B.W.G.	41.08	37.35
5 in. o.d.	9 B.W.G.	51.56	46.87
6 in. o.d.	7 B.W.G.	79.15	71.96

Extras for less-carload quantities:

25,000 lb. or ft. to 39,999 lb. or ft.	5 %
10,000 lb or ft to 24,999 lb. or ft.	12½%
2,000 lb. or ft. to 9,999 lb. or ft.	25 %
Under 2,000 lb. or ft.	40 %

Hot-Finished Lapweld Steel Pressure Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots)

1½	in o.d. 13 B.W.G.	$ 9.72
1¾	in. o.d. 13 B.W.G.	11.06
2	in. o.d. 13 B.W.G.	12.38
2¼	in. o.d. 13 B.W.G.	13.79
2½	in. o.d. 12 B.W.G.	16.58
2¾	in. o.d. 12 B.W.G.	17.54
3	in.o.d. 12 B.W.G.	18.35
3¼	in. o.d. 11 B.W.G.	21.56
3½	in. o.d. 11 B.W.G.	23.15
4	in. o.d. 10 B.W.G.	28.66
4½	in. o.d. 10 B.W.G.	35.22
5	in. o.d. 9 B.W.G.	44.25
6	in. o.d. 7 B.W.G.	68.14

Quantity Extras:

40,000 lb. or ft.	base
25,000 lb. or ft. to 39,999 lb. or ft.	plus 5%
10,000 lb. or ft. to 24,999 lb. or ft.	plus 12½%
2,000 lb. or ft. to 9,999 lb. or ft.	plus 25%
Under 2,000 lb. or ft.	plus 40%

CHARCOAL IRON BOILER TUBES

Base Discounts, f.o.b. Pittsburgh

In. O. D.	
1½ and 1¾	44
2 —2¼	13 and 10
2½—2¾	16 and 10
3	17 and 10
3¼—3½	18 and 10
4	20 and 10
4½, 5, 6	21 and 10

Extras for quantity: For 1½ to 1¾, up 8 points under 10,000 lb., up 4 points 10,000 lb. to carload. For 2 in. to 5½ in., up 2 points without supplementary 10 per cent, under 10,000 lb.; supplementary 5 per cent instead of supplementary 10 per cent for 10,000 lb. to carload.

In sizes 2 in. to 4½ in. O.D. inclusive, all tubes more than four gages heavier than standard are priced per lb. as follows: Carload and over, 9c.; extras for quantity—under 10,000 lb. 1c. per lb., 10,000 lb. to carload ½c. per lb.

CAST IRON WATER PIPE

	Per Net Ton
*6-in. and larger, del'd Chicago	$47.40 to $48.40
*4-in., del'd Chicago	50.40 to 51.40
6-in. and larger, del'd New York	45.00
4-in. del'd New York	48.00
*6-in. and larger, Birmingham	39.00 to 40.00
*4-in. Birmingham	42.00 to 43.00

Class "A" and gas pipe, $3 extra.

*Prices for lots of less than 200 tons. For 200 tons and over 6-in. and larger is $38 to $39, Birmingham, and $46.40 to $47.40, delivered Chicago, and 4-in. pipe $41 to $42, Birmingham, and $49.40 to $50.40 a ton, delivered Chicago.

RAILROAD MATERIALS

Rails and Track Supplies

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$36.27½
Angle bars, per 100 lb.	2.55

F.o.b. Code Basing Points

Light rails (from billets) per gross ton	$35.00
Light rails (from rail steel) per gross ton	34.00

	Base per 100 Lbs.
Spikes, 9/16 in. and larger	$2.40
Spikes, ½ in. and smaller	2.40
Spikes, boat and barge	2.40
Tie plates steel	1.90
Tie plates, Pacific Coast ports	2.00
Track bolts, to steam railroads	3.55
Track bolts, no jobbers, all sizes (per 100 count)	70 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Buffalo, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa.; on spikes alone, Cleveland, Youngstown, Lebanon, Pa., Columbia, Pa., Richmond, Va., Jersey City, N. J.

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine bolts .....70, 10 and 5
Carriage bolts .....70, 10 and 5
Lag bolts .....70, 10 and 5
Plow bolts, Nos. 1, 2, 3 and 7 heads .....70, 10 and 5
Hot-pressed nuts, blank or tapped, square .....70, 10 and 5
Hot-pressed nuts, blank or tapped, hexagons .....70, 10 and 5
C.p.c. and t. square or hex. nuts, blank or tapped .....70, 10 and 5
Semi-finished hexagon nuts, U.S.S., all sizes .....70, 10 and 5
Semi-finished hexagon nuts, S.A.E.
¼ in. to 7/16 in. diameter..70, 10 and 5
½ in. to 1 in. diameter....70, 10 and 5
larger than 1 in. diameter..70, 10 and 5
Stove bolts in packages, Pittsburgh.. 75
Stove bolts in packages, Chicago.... 75
Stove bolts in packages, Cleveland.... 75
Stove bolts in bulk, Pittsburgh..... 83
Stove bolts in bulk, Chicago..... 83
Stove bolts in bulk, Cleveland..... 83
Tire bolts .....60 and 5

Large Rivets

(½-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland.....$2.90
F.o.b. Chicago 3.00
F.o.b. Birmingham 3.05

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh .....70 and 5
F.o.b. Cleveland .....70 and 5
F.o.b. Chicago and Birm'g'm....70 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws, 1 in. dia. and smaller .....80, 10 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller....75
Milled headless set screws, cut thread ⅜ in. and smaller 75
Upset hex. head cap screws, U.S.S.S. or S.A.E. thread, 1 in. dia. and smaller 85
Upset set screw, cut and oval point .....75 and 10 to 80
Milled studs .....65 to 65 and 10

Alloy and Stainless Steel

Alloy Steel Ingots

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, Uncropped .....$40 per gross ton

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Base price, $49 a gross ton.

Alloy Steel Bars

Price del'd Detroit is $52.

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton. Open-hearth grade, base .....2.45c.
Delivered price at Detroit is.....2.60c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
2000 (1¼% Nickel)	$0.25
2100 (2½% Nickel)	0.55
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum) (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
6100 Chromium Vanadium Bar	1.20
6100 Chromium Vanadium Spring Steel	0.70
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars is ½c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 2.95c. base per lb.

STAINLESS STEEL No. 302

(17 to 19% Cr. 7 to 9% Ni. 0.08 to 0.20% C.)

(Base Prices, f.o.b. Pittsburgh)

Per Lb.

Forging billets .....19.55c.
Rerolling slabs ..... 15c.
Bars ..... 23c.
Plates ..... 26c.
Structural shapes ..... 23c.
Sheets ..... 33c.
Hot-rolled strip .....20¾c.
Cold-rolled strip ..... 27c.
Drawn wire ..... 23c.

Raw and Semi-Finished Steel

Carbon Steel Rerolling Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Uncropped .....$29 per gross ton

Carbon Steel Forging Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Birmingham. Uncropped .....$31 per gross ton

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham.

Per Gross Ton

Rerolling $27.00
Forging quality 32.00

Delivered Detroit

Rerolling $30.00
Forging 35.00

Billets Only F.o.b. Duluth

Rerolling $29.00
Forging 34.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open-hearth or Bessemer $28.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved ..... 1.70c.
Universal ..... 1.70c.
Sheared ..... 1.70c.

Tube Rounds

Base per Lb.

F.o.b. Pittsburgh ..... 1.80c.
F.o.b. Chicago ..... 1.85c.
F.o.b. Cleveland ..... 1.85c.
F.o.b. Buffalo ..... 1.90c.
F.o.b. Birmingham ..... 1.95c.

Wire Rods

(Common, base)

Per Gross Ton

F.o.b. Pittsburgh $38.00
F.o.b. Cleveland 38.00
F.o.b. Chicago 39.00
F.o.b. Anderson, Ind. 39.00
F.o.b. Youngstown 39.00
F.o.b. Worcester, Mass. 40.00
F.o.b. Birmingham 41.00
F.o.b. San Francisco 47.000
F.o.b. Galveston 44.00

Pig Iron and Ferroalloys

PIG IRON

PRICES PER GROSS TON AT BASING POINTS

Basing Points	No. 2 Fdry.	Malleable	Basic	Bessemer
Everett, Mass.	$19.50	$20.00	$19.00	$20.50
Bethlehem, Pa.	19.50	20.00	19.00	20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Swedeland, Pa.	19.50	20.00	19.00	20.50
Steelton, Pa.	....	....	19.00	....
Sparrows Point, Md.	19.50	....	19.00	....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Youngstown	18.50	18.50	18.00	19.00
Buffalo	18.50	19.00	17.50	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Cleveland	18.50	18.50	18.00	19.00
Toledo, Ohio	18.50	18.50	18.00	19.00
Jackson, Ohio	20.25	20.25	19.75	....
Detroit	18.50	18.50	18.00	19.00
Hamilton, Ohio	18.50	18.50	18.00	19.00
Chicago	18.50	18.50	18.00	19.00
Granite City, Ill.	18.50	18.50	18.00	....
Duluth, Minn.	19.00	19.00	....	19.50
Birmingham	14.50	14.50	13.50	19.00
Provo, Utah	17.50	....	17.00	....

DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

	No. 2 Fdry.	Malleable	Basic	Bessemer
Boston Switching District				
From Everett, Mass.	$20.00	$20.50	$19.50	$21.00
Brooklyn				
From East. Pa.	21.9289	22.4289	21.9289	22.9289
Newark or Jersey City, N. J.				
From East. Pa.	20.9873	21.4873	20.4873	21.9873
Philadelphia				
From Eastern Pa.	20.26	20.76	19.76	21.26
Cincinnati				
From Hamilton, Ohio	19.51	19.51	19.01	20.01
Canton, Ohio				
From Cleveland and Youngstown	19.76	19.76	19.26	20.26
Columbus, Ohio				
From Hamilton, Ohio	20.50	20.50	....	....
Mansfield, Ohio				
From Cleveland and Toledo	20.26	20.26	....	....
Indianapolis				
From Hamilton, Ohio	20.93	20.93	....	....
South Bend, Ind.				
From Chicago	20.6935	20.6935	....	....
Milwaukee				
From Chicago	19.57	19.57	....	....
St. Paul				
From Duluth	20.94	....	....	....
Davenport, Iowa				
From Chicago	20.3832	20.3832	....	....
Kansas City				
From Granite City	21.04	21.04	....	....

Delivered prices on Southern iron for shipment to Northern points are 38c. a gross ton below delivered prices from the nearest Northern basing points.

LOW PHOSPHORUS PIG IRON

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.....$23.50

GRAY FORGE PIG IRON

Valley furnace $18.00
Pittsburgh district furnace 18.00

CHARCOAL PIG IRON

Lake Superior furnace $21.00

Delivered Chicago 24.2528

Delivered Buffalo 24.57

CANADA

Pig Iron

Per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75.....$21.00
No. 2 fdy., sil. 1.75 to 2.75..... 20.50
Malleable 21.00

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75.....$22.50
No. 2 fdy., sil. 1.75 to 2.25..... 22.00
Malleable 22.50
Basic 22.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload) $85.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21% $26.00

Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads) $77.50
50% (ton lots) 85.00
75% (carloads 126.00
75% (ton lots) 136.00

Silvery Iron

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
6%	$22.75	12%	$29.25
7%	23.75	13%	30.75
8%	24.75	14%	32.25
9%	25.75	15%	33.75
10%	26.75	16%	35.25
11%	27.75	17%	36.75

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
10%	$27.75	14%	$33.25
11%	28.75	15%	34.75
12%	30.25	16%	36.25
13%	31.75	17%	37.75

Manganese 1½ to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W. del., carloads .....$1.35 to $1.45
Ferrotungsten, less carloads. 1.45 to 1.55
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads ..... 10.00c.
Ferrochromium, 2% carbon .....16.50c. to 17.00c.
Ferrochromium, 1% carbon .....17.50c. to 18.00c.
Ferrochromium, 0.10% carbon .....19.50c. to 20.00c.
Ferrochromium, 0.06% carbon .....20.00c. to 20.50c.
Ferrovanadium, del. per lb. contained V. .....$2.70 to $2.90
Ferrocarbontitanium, 15 to 18% Ti, 6 to 8% C, f.o.b. furnace carload and contract per net ton.$137.50
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with $2 unitage 50.00
Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with $2.75 unitage 65.00
Ferromolybdenum, per lb. Mo., del. 95c.
Calcium molybdate, per lb. Mo., del. ..... 80c.
Silico spiegel, per ton, f.o.b. furnace, car lots $38.00
Ton lots or less per ton 45.50
Silico-manganese, gross ton, delivered:
2.50% carbon grade 90.00
2% carbon grade 95.00
1% carbon grade 105.00
Spot prices .....$5 a ton higher

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$11.25 to $11.75
No. 2 heavy melting steel	9.75 to 10.25
No. 2 railroad wrought	11.25 to 11.75
Scrap rails	11.50 to 12.00
Rails, 3 ft. and under	12.75 to 13.25
Compressed sheet steel	11.00 to 11.50
Hand bundled sheet steel	10.00 to 10.50
Hvy. steel axle turnings	10.00 to 10.50
Machine shop turnings	7.50 to 8.00
Short shov. turnings	7.50 to 8.00
Short mixed borings and turnings	6.00 to 6.50
Cast iron borings	6.00 to 6.50
Cast iron carwheels	12.00 to 12.50
Heavy breakable cast	11.00 to 11.50
No. 1 cast	12.00 to 12.50
Railr. knuckles and couplers	14.00 to 14.50
Rail, coil and leaf springs	14.00 to 14.50
Rolled steel wheels	14.00 to 14.50
Low phos. billet crops	14.75 to 15.25
Low phos. sheet bar crops	14.25 to 14.75
Low phos. plate scrap	14.00 to 14.50
Low phos. punchings	14.00 to 14.50
Steel car axles	14.25 to 14.75

CHICAGO

Delivered Chicago district consumers:

	Per Gross Ton
Heavy melting steel	$9.50 to $10.00
Automobile hvy. melt. steel	9.00 to 9.50
Shoveling steel	9.50 to 10.00
Hydraulic comp. sheets	8.50 to 9.00
Drop forge flashings	7.50 to 8.00
No. 1 busheling	8.25 to 8.75
Rolled carwheels	10.50 to 11.00
Railroad tires	11.50 to 12.00
Railroad leaf springs	10.50 to 11.00
Axle turnings	9.00 to 9.50
Steel couplers and knuckles	11.00 to 11.50
Coil springs	12.00 to 12.50
Axle turnings (elec. fur.)	9.50 to 10.00
Low phos. punchings	12.00 to 12.50
Low phos. plates, 12 in. and under	12.00 to 12.50
Cast iron borings	5.00 to 5.50
Short shoveling turnings	5.00 to 5.50
Machine shop turnings	5.00 to 5.50
Rerolling rails	11.00 to 11.50
Steel rails, less than 3 ft.	12.00 to 12.50
Steel rails, less than 2 ft.	12.50 to 13.00
Angle bars, steel	11.25 to 11.75
Cast iron carwheels	10.50 to 11.00
Railroad malleable	13.00 to 13.50
Agricultural malleable	9.50 to 10.00

	Per Net Ton
Iron car axles	$14.50 to $15.00
Steel car axles	13.50 to 14.00
No. 1 railroad wrought	8.00 to 8.50
No. 2 railroad wrought	8.50 to 9.00
No. 2 busheling	4.50 to 5.00
Locomotive tires, smooth	10.00 to 10.50
Pipe and flues	*5.00 to 5.50*
No. 1 machinery cast	9.00 to 9.50
Clean automobile cast	8.50 to 9.00
No. 1 railroad cast	8.00 to 8.50
No. 1 agricultural cast	8.00 to 8.50
Stove plate	5.00 to 5.50
Grate bars	5.50 to 6.00
Brake shoes	6.00 to 6.50

PHILADELPHIA

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$9.50 to $10.00
No. 2 heavy melting steel	8.50 to 9.00
No. 1 railroad wrought	10.50 to 11.00
Bundled sheets	9.50 to 10.00
Hydraulic compressed, new	9.00 to 9.50
Hydraulic compressed, old	6.50 to 7.00
Machine shop turnings	5.50 to 6.00
Heavy axle turnings	8.50 to 9.00
Cast borings	5.00 to 5.50
Stove plate (steel works)	8.00 to 8.25
Heavy breakable cast	10.00 to 10.50
No. 1 low phos. heavy	14.50 to 15.00
Couplers and knuckles	13.50 to 14.00
Rolled steel wheels	13.50 to 14.00
No. 1 blast furnace	5.00 to 5.50
Spec. iron and steel pipe	8.00 to 8.50
Shafting	17.00 to 17.50
Steel axles	16.00
No. 1 forge fire	9.50 to 10.00
Cast iron carwheels	11.00 to 11.50
No. 1 cast	11.00
Cast borings (chem.)	12.00 to 14.00
Steel rails for rolling	12.00 to 12.50

CINCINNATI

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$7.50 to $8.00
No. 2 heavy melting steel	6.00 to 6.50
Scrap rails for melting	7.50 to 8.00
Loose sheet clippings	4.00 to 4.50
Bundled sheets	5.50 to 6.00
Cast iron borings	4.00 to 4.50
Machine shop turnings	4.00 to 4.50
No. 1 busheling	5.50 to 6.00
No. 2 busheling	2.25 to 2.75
Rails for rolling	8.50 to 9.00
No. 1 locomotive tires	6.75 to 7.25
Short rails	11.00 to 11.50
Cast iron carwheels	7.50 to 8.00
No. 1 machinery cast	8.75 to 9.25
No. 1 railroad cast	8.00 to 8.50
Burnt cast	5.50 to 6.00
Stove plate	5.50 to 6.00
Agricultural malleable	7.50 to 8.00
Railroad malleable	8.50 to 9.00

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$9.75 to $10.25
No. 2 heavy melting steel	9.25 to 9.75
Compressed sheet steel	9.25 to 9.75
Light bundled sheet stampings	7.00 to 7.50
Drop forge flashings	8.00 to 8.50
Machine shop turnings	5.00 to 5.50
Short shoveling turnings	6.00 to 6.50
No. 1 busheling	8.50 to 9.00
Steel axle turnings	8.50 to 9.00
Low phos. billet crops	14.00 to 14.50
Cast iron borings	6.25 to 6.75
Mixed borings and short turnings	6.25 to 6.75
No. 2 busheling	6.25 to 6.75
No. 1 cast	11.50 to 12.00
Railroad grate bars	7.00 to 7.50
Stove plate	7.25 to 7.75
Rails under 3 ft.	14.00 to 14.50
Rails for rolling	15.50 to 16.00
Railroad malleable	13.00 to 13.50
Cast iron carwheels	10.75 to 11.00

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

No. 1 heavy melting steel	$10.00
No. 2 heavy melting scrap	8.50
Scrap rails	11.00
New hydraul. comp. sheets	8.50
Old hydraul. comp. sheets	7.50
Drop forge flashings	8.50
No. 1 busheling	$8.50 to 9.00
Hvy. steel axle turnings	8.00 to 8.50
Machine shop turnings	4.50 to 5.00
Knuckles and couplers	11.50 to 12.00
Coil and leaf springs	11.50 to 12.00
Rolled steel wheels	11.50 to 12.00
Low phos. billet crops	12.00 to 12.50
Short shov. steel turnings	6.00 to 6.50
Short mixed borings and turnings	6.00 to 6.50
Cast iron borings	6.00 to 6.50
No. 2 busheling	6.50
Steel car axles	11.50 to 12.00
Iron axles	11.50 to 12.00
No. 1 machinery cast	11.00 to 11.50
No. 1 cupola cast	10.00 to 10.50
Stove plate	9.00 to 9.50
Steel rails, 3 ft. and under	12.50 to 13.00
Cast iron carwheels	11.00 to 11.50
Industrial malleable	12.00 to 13.00
Railroad malleable	12.00 to 13.00
Chemical borings	8.00 to 8.50

BOSTON

Dealers' buying prices per gross ton:

*No. 1 heavy melting steel	$8.50
No. 1 heavy melting steel	$5.25 to 6.00
*Scrap T rails	8.50
*No. 2 steel	7.50
No. 2 steel	5.00
Breakable cast	5.00 to 5.25
Machine shop turnings	1.25 to 1.60
Bundled skeleton, long	4.50 to 4.75
Forge flashings	4.50 to 4.75
Mixed borings and turnings	1.00 to 1.50
Shafting	12.00 to 12.50
Steel car axles	11.50 to 12.00
Cast iron borings, chemical	6.50 to 7.00
Stove plate	4.00 to 4.25

Per gross ton delivered consumers' yards:

Textile cast	$9.00 to $9.50
No. 1 machinery cast	9.00 to 9.50
Stove plate	6.00 to 6.50
Railroad malleable	11.00 to 11.50

* Delivered local army base.

NEW YORK

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	*$7.00 to †$8.50
No. 2 heavy melting steel	*5.50 to †7.00
Heavy breakable cast	6.00 to 6.25
No. 1 machinery cast	7.00 to 7.50
No. 2 cast	6.25
Stove plate	6.25
Steel car axles	13.50 to 14.00
No. 1 railroad wrought	7.00 to 7.50
No. 1 yard wrought, long	6.00 to 6.50
Spec. iron and steel pipe	4.50 to 5.00
Forge fire	5.50 to 6.00
Rails for rolling	8.50 to 9.00
Short shoveling turnings	1.75 to 2.00
Machine shop turnings	2.00 to 2.50
Cast borings	3.50 to 3.75
No. 1 blast furnace	2.00 to 2.50
Cast borings (chemical)	11.00 to 11.50
Unprepared yard iron and steel	4.00

Per gross ton, delivered local foundries:

No. 1 machinery cast	$10.00
No. 1 hvy. cast (cupola size)	9.00
No. 2 cast	7.50

* For direct car loading only.
† Loading on barge.

BIRMINGHAM

Per gross ton delivered consumers' yards:

Heavy melting steel	$9.00 to $9.50
Scrap steel rails	10.00 to 10.50
Short shoveling turnings	7.00
Stove plates	7.00
Steel axles	11.50
Iron axles	11.50
No. 1 railroad wrought	7.00
Rails for rolling	12.50
No. 1 cast	9.50 to 10.00
Tramcar wheels	10.00

ST. LOUIS

Per gross ton delivered consumers' yards:

Selected heavy steel	$8.50 to $9.00
No. 1 heavy melting	8.00 to 8.50
No. 2 heavy melting	7.00 to 7.50
No. 1 locomotive tires	9.75 to 10.25
Misc. stand-sec. rails	9.25 to 9.50
Railroad springs	9.50 to 10.00
Bundled sheets	6.00 to 6.50
No. 2 railroad wrought	8.00 to 8.50
No. 1 busheling	5.00 to 5.50
Cast iron borings and shoveling turnings	3.00 to 3.50
Rails for rolling	10.00 to 10.50
Machine shop turnings	2.75 to 3.25
Heavy turnings	5.50 to 6.00
Steel car axles	12.50 to 13.00
Iron car axles	15.00 to 16.00
No. 1 railroad wrought	6.00 to 6.50
Steel rails less than 3 ft.	11.50 to 12.00
Steel angle bars	9.50 to 10.00
Cast iron carwheels	7.00 to 7.50
No. 1 machinery cast	8.50 to 9.00
Railroad malleable	9.50 to 10.00
No. 1 railroad cast	8.00 to 8.50
Stove plate	6.50 to 7.00
Agricult. malleable	8.50 to 9.00

DETROIT

Dealers' buying prices per gross ton:

Heavy melting steel	$7.50 to $8.00
Borings and short turnings	4.00 to 4.50
Long turnings	$3.50 to $4.00
No. 1 machinery cast	10.25 to 10.75
Automotive cast	10.75 to 11.25
Hydraul. comp. sheets	7.50 to 8.00
Stove plate	6.50 to 7.00
New factory busheling	6.50 to 7.00
Old No. 2 busheling	3.75 to 4.25
Sheet clippings	4.50 to 5.00
Flashings	6.75 to 7.25
Low phos. plate scrap	7.50 to 8.00

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy melting steel	$7.00	$7.00
Rails scrap	8.00	8.00
Machine shop turnings	3.00	3.00
Boiler plate	4.50	4.50
Heavy axle turnings	4.50	4.00
Cast borings	4.00	3.50
Steel borings	2.00	2.00
Wrought pipe	3.50	3.50
Steel axles	7.00	8.00
Axles, wrought iron	7.00	8.00
No. 1 machinery cast	9.00	9.00
Stove plate	5.50	5.00
Standard carwheels	7.25	7.00
Malleable	6.75	7.00

ORES, FLUORSPAR, COKE, FUEL, REFRACTORIES

Lake Superior Ores

Delivered Lower Lake Ports

	Per Gross Ton
Old range, Bessemer, 51.50% iron	$4.80
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi, Bessemer, 51.50% iron	4.65
Mesabi, non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore

C.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algeria	9.50c.
Iron, low phos., Swedish, average 68½% iron	9.50c.
Iron, basic or foundry, Swedish, aver. 65% iron	9c.
Iron, basic or foundry, Russian, aver. 65% iron	9c.
Manganese, Caucasian, washed 52%	26c.
Manganese, African, Indian, 44-48%	21c.
Manganese, African, Indian, 49-51%	24c.
Manganese, Brazilian, 46 to 48½%	20c.

	Per Net Ton Unit
Tungsten, Chinese, wolframite, duty paid, delivered*	$17.50 to $18.50
Tungsten, domestic, scheelite, delivered†	17.00

	Per Gross Ton
Chrome, 45%, Cr_2O_3, crude, c.i.f. Atlantic Seaboard	$17.00
Chrome, 48%, Cr_2O_3, c.i.f. Atlantic Seaboard	20.00

* Quotations nominal in absence of sales.
† Nominal; no supplies available.

Fluorspar

	Per Net Ton
Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines for all-rail shipment	$13.00
Same grade for Ohio River barge shipment for Kentucky and Illinois River landings	16.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	14.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	19.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	30.00

COKE, COAL AND FUEL OIL

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville Prompt	$3.85
Foundry, f.o.b. Connellsville Prompt	$4.60 to 5.10
Foundry, by-product, Chicago ovens, for delivery outside switching district	8.50
Foundry, by-product, delivered in Chicago switching district	9.25
Foundry, by-product, New England, delivered	11.00
Foundry, by-product, Newark or Jersey City, del'd	9.20 to 9.65
Foundry, by-product, Phila.	9.00
Foundry, by-product, Cleveland, delivered	$9.25
Foundry, Birmingham	6.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.80 to $2.05
Mine run coking coal, f.o.b. W. Pa.	2.05 to 2.25
Gas coal, ¾-in., f.o.b. Pa. mines	2.25 to 2.35
Mine run gas coal, f.o.b. Pa. mines	2.05 to 2.45
Steam slack, f.o.b. W. Pa. mines	1.55 to 1.65
Gas slack, f.o.b. W. Pa. mines	1.90 to 2.10

Fuel Oil

Per Gal. f.o.b. Bayonne, N. J.	
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.
Per Gal. f.o.b. Baltimore	
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.
Per Gal. del'd Chicago	
No. 3 industrial fuel oil	3.88c.
No. 5 industrial fuel oil	3.38c.
Per Gal. f.o.b. Cleveland	
No. 3 distillate	5.50c.
No. 4 industrial	5.25c.
No. 5 industrial	4.25c.

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works High-heat Duty Brick	Intermediate Duty Brick
Pennsylvania	$45.00	$40.00
Maryland	45.00	40.00
New Jersey	55.00	42.00
Ohio	45.00	40.00
Kentucky	45.00	40.00
Missouri	45.00	40.00
Illinois	45.00	40.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$45.00
Chicago District	54.00
Birmingham	55.00
Silica clay, per net ton	8.00

Chrome Brick

	Per Net Ton
Standard, f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	$45.00
Chemically Bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	42.50

Magnesite Brick

	Per Net Ton
Standard, f.o.b. Baltimore and Chester, Pa.	$65.00
Chemically Bonded, f.o.b. Baltimore	55.00

Grain Magnesite

	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa.	$45.00
Domestic, f.o.b. Baltimore and Chester	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

Warehouse Prices for Steel Products

PITTSBURGH

Base per Lb.

Plates	3.15c.
Structural shapes	3.15c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.90c.
Cold-finished and screw stock:	
Rounds and hexagons	3.20c.
Squares and flats	3.20c.
Hoops and bands under ¼ in.	3.20c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.30c.
Galv. sheets (No. 24), 25 or more bundles	3.95c.
Hot-rolled sheets (No. 10)	2.95c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$3.69
Spikes, large	2.90c.
Track bolts, all sizes, per 100 count,	65 per cent off list.
Machine bolts, 100 counts,	65 per cent off list.
Carriage bolts, 100 count,	65 per cent off list.
Nuts, all styles, 100 count,	65 per cent off list.
Large rivets, base per 100 lb.	$3.50
Wire, black, soft ann'l'd, base per 100 lb.	*2.70
Wire, galv. soft, base per 100 lb.	*2.925
Common wire nails, per keg	*2.834
Cement coated nails, per keg	*2.834

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

CHICAGO

Base per Lb.

Plates and structural shapes	3.20c.
Soft steel bars	2.95c.
Cold-fin. steel bars:	
Rounds and hexagons	3.50c.
Flats and squares	3.50c.
Hot-rolled strip	3.30c.
Hot-rolled annealed sheets (No. 24)	3.85c.
Galv. sheets (No. 24)	4.55c.
Hot-rolled sheets (No. 10)	3.05c.
Spikes (keg lots)	3.50c.
Track bolts (keg lots)	4.65c.
Rivets, structural (keg lots)	3.65c.
Rivets, boiler (keg lots)	3.75c.

Per Cent Off List

Machine bolts	*70
Carriage bolts	*70
Lag screws	*70
Hot-pressed nuts, sq. tap. or	
Hot-pressed nuts,. sq. tap or blank	*70
Hot-pressed nuts, hex. tap or	
Hot-pressed nuts, hex. tap or blank	*70
Hex. head cap screws	80
Cut point set screws	70 and 10
Flat head bright wood screws	37½ and 10
Spring cotters	50
Stove bolts in full packages	70
Rd. hd. tank rivets, 7/16 in. and smaller	57½
Wrought washers	$4.50 off list
No. 8 black ann'l'd wire per 100 lb.	$3.85
Com. wire nails, base per keg	3.05
Cement c't'd nails, base per keg	3.05

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 65 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b., Chicago, with full or partial freight allowed up to 50c. per 100 lb.

NEW YORK

Base per Lb.

Plates, ¼ in. and heavier	3.40c.
Structural shapes	3.37c.
Soft steel bars, small shapes	3.26c.
Iron bars	3.26c.
Iron bars, swed. charcoal	6.50c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	3.81c.
Flats and squares	4.31c.
Cold-rolled; strip, soft and quarter hard	3.36c.
Hoops	3.56c.
Bands	3.56c.
Hot-rolled sheet (No. 10)	3.31c.
Hot-rolled ann'l'd sheets (No. 24*)	3.89c.
Galvanized sheets (No. 24*)	4.50c.
Long terne sheets (No. 24)	5.20c.
Standard tool steel	11.00c.
Wire, black annealed (No. 10)	3.40c.
Wire, galv. (No. 10)	3.75c.
Tire steel, 1 x ½ in. and larger	3.65c.
Open hearth spring steel	4.00c. to 10.00c.
Common wire nails, base, per keg	$3.21

Per Cent

Machine bolts, cut thread:	Off List
All diameters	65 and 10
Carriage bolts, cut thread:	
All diameters	65 and 10

Per 100 Ft.

Boiler tubes:	
Lap welded, 2-in.	$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

Base per Lb.

Plates and struc. shapes	3.44c.
Bars, soft steel or iron	3.19c.
Cold-fin. rounds, shafting, screw stocks	3.74c.
Hot-rolled annealed sheets (No. 24)	4.09c.
Galv. sheets (No. 24)	4.64c.
Hot-rolled sheets (No. 10)	3.29c.
Black corrug. sheets (No. 24)	4.09c.
*Galv. corrug. sheets	4.64c.
Structural rivets	3.99c.
Boiler rivets	4.09c.

Per Cent Off List

Tank rivets, 7/16 in. and smaller	55
Machine and carriage bolts, lag screws fittings up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts: All quantities	70

*No. 26 and lighter take special prices.

PHILADELPHIA

Base per Lb.

*Plates, ¼-in. and heavier	2.95c.
*Structural shapes	2.95c.
*Soft steel bars, small shapes, iron bars (except bands)	2.90c.
‡Reinforc. steel bars, sq. twisted and deformed	2.955c.
Cold-finished steel bars	3.73c.
*Steel hoops	3.40c.
*Steel bands, No. 12 and 3/16 in., incl.	3.15c.
Spring steel	5.00c.
†Hot-rolled anneal. sheets (No. 24)	3.55c.
†Galvanized sheets (No. 24)	4.25c.
*Hot-rolled annealed sheets (No. 10)	3.05c.
Diam. pat. floor plates, ¼ in.	4.95c.
Swedish iron bars	6.25c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 50 bundles or over.

‡For less than 2000 lb.

CLEVELAND

Base per Lb.

Plates and struc. shapes	3.31c.
Soft steel bars	2.95c.
Reinforc. steel bars	*2.10c.
Cold-finished steel bars	3.25c.
Flat-rolled steel under ¼ in.	3.36c.
Cold-finished strip	†3.00c.
Hot-rolled annealed sheets (No. 24)	3.96c.
Galvanized sheets (No. 24)	4.61c.
Hot-rolled sheets (No. 10)	3.11c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.56c.
Black ann'l'd wire, per 100 lb.	$2.65
No. 9 galv. wire, per 100 lb.	3.00
Com. wire nails, base per keg	2.40

*Plus mill, size and quantity extras.

†Outside delivery 10c. less.

CINCINNATI

Base per Lb.

Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.15c.
New billet reinforc. bars	3.25c.
Rail steel reinforc. bars	3.25c.
Hoops and bands, 3/16 in. and lighter	3.45c.
Cold-finished bars	3.75c.
Hot-rolled annealed sheets (No. 24)	4.00c.
Galv. sheets (No. 24)	4.70c.
Hot-rolled sheets (No. 10)	3.20c.
Structural rivets	4.35c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	$2.91
Com. wire nails, base per keg:	
1 to 24 kegs	3.50
25 to 50 kegs	3.30
Large quantities	3.10
Cement c't'd nails, base 100-lb. keg	3.50
Chain, 1-in., per 100 lb.	8.35

Net per 100 Ft.

Seamless steel boiler tubes, 2-in.	$19.03
4-in.	44.96
Lap-welded steel boiler tubes, 2-in.	18.10
4-in.	42.32

BUFFALO

Base per Lb.

Plates	3.37c.
Struc. shapes	3.25c.
Soft. steel bars	3.00c.
Reinforcing bars	2.60c.
Cold-fin. flats and sq.	3.55c.
Round and hex.	3.55c.
Cold-rolled strip steel	3.19c.
Hot-rolled annealed sheets (No. 24)	4.05c.
Heavy hot-rolled sheets, 3/16 in., 24 to 48 in. wide	3.62c.
Galv. sheets (No. 24)	4.70c.
Bands	3.42c.
Hoops	3.42c.
Hot-rolled unannealed sheets	3.17c.
Com. wire nails, base per keg	$3.35
Black wire, base per 100 lb.	3.55

BOSTON

Per Lb. Base

Beams, channels, angles, tees, zees	3.52c.
H beams and shapes	3.52c.
Plates—sheared, tank and univ. mill, ¼ in. thick and heavier	3.53c.
Floor plates, diamond pattern	5.33c.
Bar and bar shapes (mild steel)	3.30c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.60c. to 4.60c.
Half rounds, half ovals, ovals and bevels	4.55c.
Tire steel	4.55c.
Cold-rolled strip steel	3.245c.
Cold-finished rounds, squares and hexagons	3.85c.
Cold-finished flats	3.70c.
Blue annealed sheets, No. 10 gal.	3.60c.
One pass cold-rolled sheets No. 24 ga.	4.15c.
Galvanized steel sheets, No. 24 ga.	4.85c.
Lead coated sheets, No. 24 ga.	5.80c.

Prices delivered by truck in metropolitan Boston, subject to quantity differentials.

MILWAUKEE

Base per Lb.

Plates and structural shapes	3.31c.
Soft steel bars	3.06c.
Hot-rolled strip	3.41c.
Hot-rolled sheets (No. 10)	3.16c.
Hot-rolled annealed sheets (No. 24)	3.96c.
Galvanized sheets (No. 24)	4.66c.
Cold-finished steel bars	3.61c.
Cold-rolled strip	3.30c.
Structural rivets (keg lots)	3.86c.
Boiler rivets (keg lots)	3.96c.
Track spikes (keg lots)	3.71c.
Track bolts (keg lots)	4.86c.
Black annealed wire	3.10c.
Com. wire nails	2.90c.
Cement coated nails	2.90c.

Per Cent Off List

Machine bolts	70
Carriage bolts	70
Hot-pressed nuts, sq. and hex., tapped or blank (keg lots)	70

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on order of 400 to 3499 lb. On cold-finished bars the prices are for orders of 300 to 499 lb

PACIFIC COAST

Base per Lb.

	San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	3.55c.	3.60c.	3.55c.
Shapes, standard	3.55c.	3.60c.	3.55c.
Soft steel bars	3.60c.	3.60c.	3.60c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.45c.	2.45c.	2.45c.
Hot-rolled annealed sheets (No. 24)	4.40c.	4.35c.	4.40c.
Hot-rolled sheets (No. 10)	3.75c.	3.70c.	3.75c.
Galv. sheets (No. 24)	5.00c.	4.95c.	5.00c.
Cold finished steel:			
Rounds	5.95c.	5.85c.	6.00c.
Squares and hexagons	7.20c.	7.10c.	7.25c.
Flats	7.70c.	7.60c.	8.25c.
Common wire nails —base per keg less carload	$3.30	$3.40	$3.30

All items subject to differentials for quantity.

TOOL STEEL

Prices are same for warehouse distribution at all points on or East of Mississippi River. West of Mississippi quotations are 1c. a lb. higher.

Base per Lb.

High speed	57c.
High carbon chrome	37c.
Oil hardening	22c.
Extra	17c.
Regular	14c.

Weekly Indications of Steel Activity

From THE IRON AGE

	Apr. 23, 1935	Apr. 16, 1935	Mar. 26, 1935	Apr. 24, 1934	Average, Year to Date, 1935	1934
Steel ingot operations—Per cent of capacity	47.0	46.5	46.5	56.0	48.8	43.1

	Week Ended Apr. 23, 1935	Apr. 16, 1935	Mar. 26, 1935	Apr. 24, 1934	Year to Date 1935	1934
Fabricated structural steel awards	9,350	32,025	17,600	21,420	231,538	256,245
Fabricated plate awards	3,100	4,410	1,800	1,370	34,465	35,702
Sheet steel piling awards	8,050	150	0	1,100	11,965	18,670
Reinforcing bar awards	7,200	16,955	5,710	3,055	82,890	72,335

Lead Quotations Again Advanced $1 A Ton, as Zinc Holds Its Own

Copper Sales Lighter Because of Week-end Holidays—Tin Also Affected by London Closing As Demand Here Remains Light

NEW YORK, April 23.—Copper buying was adversely affected here by the week-end holidays abroad, with sales from Friday to Monday inclusive having amounted to only about 1200 tons. This brought the total for the month through yesterday to 19,450 tons, almost 5000 tons behind bookings in the corresponding period of March. Sellers, however, believe that the industry's "book" of 30,000 tons may still be reached during April as recent commitments have been far behind current consumption. Fabricators are rather busy and their operations are tending to expand rather than contract. The Blue Eagle price remains unchanged at 9c. a lb., Connecticut Valley, and quotations on electrolytic abroad this morning ranged from 7.65c. to 7.75c. a lb., usual Continental base ports. March statistics, which became available over the week-end, revealed an improvement in the American position, but were rather discouraging for the remainder of the world. However, the effects of the recent international conference were not reflected in March figures and will certainly have a beneficial influence.

Lead

Lead prices were again advanced $1 a ton yesterday, and are now firmly established at 3.60c. a lb., St. Louis, and 3.75c., New York. The St. Joseph Lead Co., which initiated the advance, is quoting its usual $1 premium on sales in the East. Quotations are now $5 a ton above the year's low reached during February, and current strong steady demand indicates that a further price rise would probably be justified. Following the increase yesterday, sellers were immediately able to place their intakes and the tight character of the market was not relieved. While March statistics are not yet available, it is freely predicted that shipments this month will show an increase of as much as 10,000 tons.

Zinc

The spelter market is very well maintained at 4.45c., New York, and 4.10c., East St. Louis, the levels which were established last Wednesday. As most sellers are fully booked, price shading is entirely lacking. Sales last week amounted to about 2500 tons, exceeding the expectations of many interests because of the large total of 12,000 tons booked in the preceding week. Activity in the galvanizing industry is increasing and promises to be maintained at a high level during the remainder of the quarter. Production this month is running well behind last month, and, as shipments are probably at least as good as they were in March, it is believed that April statistics will be very encouraging. The ore market has finally strengthened in sympathy with higher spelter quotations and practically all sellers are now asking $27 a ton for both the flotation and coarse grades.

Bids will be opened May 3 by the Bureau of Supplies and Accounts, Navy Department, for 500 tons of medium-steel plates, 250 tons to be used for each of the gunboats *Erie* and *Charleston* building at the Brooklyn and Charleston, S. C., navy yards, respectively, and 500 tons for the light cruiser *Philadelphia* building at the Philadelphia Navy Yard.

Caterpillar Tractor Co. had net income of $1,084,777 in the first quarter of 1935, equal to 58c. a share on the common stock, compared with 42c. a share in the corresponding period of 1934. Sales for the first quarter amounted to $7,603,445 against $5,544,474 in the 1934 period.

The Week's Prices. Cents Per Pound for Early Delivery

	April 17	April 18	April 19	April 20	April 22	April 23
Electrolytic copper, N. Y.*	8.75	8.75	8.75	8.75	8.75	8.75
Lake copper, N. Y.	9.12½	9.12½	9.12½	9.12½	9.12½	9.12½
Straits tin, Spot, New York	50.75	50.50	...	...	50.75	50.62½
Zinc, East St. Louis	4.10	4.10	4.10	4.10	4.10	4.10
Zinc, New York	4.45	4.45	4.45	4.45	4.45	4.45
Lead, St. Louis	3.55	3.55	3.55	3.55	3.60	3.60
Lead, New York	3.70	3.70	3.70	3.70	3.75	3.75

*Refinery quotations; price ¼c. higher delivered in Connecticut.

Aluminum, virgin 99 per cent plus, 19c. to 22c. a lb., delivered.
Aluminum, remelt No. 12 (alloy), carload lots delivered, 14c. a lb., average for week.
Nickel, electrolytic, 35c. to 36c. a lb. base at refinery in lots of 2 tons or more.
Antimony, 14.25c. a lb., New York.
Brass ingots, 85-5-5-5, 8.25c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	51.75c. to 52.75c.
Tin, bar	53.75c. to 54.75c.
Copper, Lake	10.25c. to 11.00c.
Copper, electrolytic	10.00c. to 10.50c.
Copper, castings	9.75c. to 10.75c.
*Copper sheets, hot-rolled	16.00c.
*High brass sheets	14.25c.
*Seamless brass tubes	16.00c.
*Seamless copper tubes	16.25c.
*Brass rods	12.75c.
Zinc, slabs	5.75c. to 6.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	10.25c.
Lead, American pig	4.50c. to 5.50c.
Lead, bar	5.50c. to 6.50c.
Lead, sheets	7.50c.
Antimony, Asiatic	15.50c. to 16.50c.
Alum., virgin, 99 per cent, plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.00c. to 19.00c.
Solder, ½ and ½	30.00c. to 31.00c.
Babbitt metal, commercial grades	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	55.00c.
Tin, bar	57.00c.
Copper, Lake	10.00c.
Copper, electrolytic	10.00c.
Copper, castings	9.75c.
Zinc, slabs	5.50c. to 5.75c.
Lead, American pig	4.50c. to 4.75c.
Lead, bar	7.75c.
Antimony, Asiatic	16.50c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	56.75c.
Solder, ½ and ½	31.50c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	5.87½c.	6.62½c.
Copper, hvy. and wire	5.75c.	6.25c.
Copper, light and bottoms	4.75c.	5.25c.
Brass, heavy	3.12½c.	3.75c.
Brass, light	2.37½c.	3.12½c.
Hvy. machine composition	4.62½c.	5.12½c.
No. 1 yel. brass turnings	4.12½c.	4.62½c.
No. 1 red brass or compos. turnings	4.37½c.	4.87½c.
Lead, heavy	2.62½c.	3.00c.
Zinc	2.00c.	2.37½c.
Cast aluminum	10.12½c.	11.25c.
Sheet aluminum	11.50c.	13.00c.

Steel Bookings Well Maintained at New York

Tin Plate Releases Reflect Increasing Consumption of Can Companies — World Tube Cartel Wrecked by Saar Dispute

NEW YORK, April 23.—Steel bookings are holding up rather well in the aggregate, although they are showing some recession in the heavier rolled products.

Tin plate releases are in especially good volume. Can manufacturers are said to have had the best first quarter in business volume in their history. The market for service station oil cans, which incidentally are made of terne plate rather than tin plate, is steadily expanding. The old market for 5-gal. cans, which the container manufacturers lost when service stations came into vogue, is now being regained in the form of a market for quart oil cans. Besides the growth in consumption by can companies, there is an increase over 1934 in demand for tin and terne plate which is due to the absence of the accumulated stocks that were carried over from 1933 into 1934 by the container makers.

Export demand for tin plate remains quiet. Most foreign buyers bought heavily last year in anticipation of the new method of price quoting inaugurated by the international cartel. The cartel has been strengthened by the adhesion of Norwegian and Italian producers. Practically every producing country is now a member of the syndicate except Japan, which still has an import balance. The American export price of tin plate remains at approximately $4.25 per base box, Pittsburgh, unchanged since late last fall.

The international tube cartel has broken down as a result of a dispute between Germany and France as to the reapportionment of export quotas following the transfer of the Saar to Germany. Wide open competition now prevails and prices in some instances have been cut to as low as $25 a ton, mill, as compared with quotations that usually range from $60 to $100 a ton, depending upon the product.

Plans on the lift span for the Triborough bridge, New York, requiring 15,000 tons of structural steel, are due to come out this week. Another Triborough span, calling for 10,000 tons, will come up for bids next month. Plans will also be issued this week on the New York side of the Midtown tunnel plaza, which will require about 2000 tons of structural steel, not counting a substantial tonnage for the tunnel approach on which alternate bids on structural steel and cast iron segments will be taken.

The Alco Products Co. has purchased 1350 tons of plates for pipe to be laid in the Borough of Queens, New York, from a Pittsburgh mill. Pending pipe jobs involving plates include 600 tons for Elmira, N. Y., and 500 tons for Niagara Falls, N. Y.

Although grade separation work promises to be conspicuous in the construction program which will be financed by the latest Federal appropriation, shore protection along the Atlantic Coast will also take sizable tonnages of steel. A number of the municipalities along the New Jersey coast have cooperated to develop a coordinated plan of shore protection which they expect to carry out with the assistance of Federal funds.

Maintenance of resale prices on steel pipe remains one of the most perplexing problems under the steel code. Although there may be some amendment to the code affecting this as well as a number of other difficult situations, there is a growing feeling that the steel code will be continued without material change.

Pig Iron

Shipments and new business have tapered off somewhat as a natural reflection of decreased foundry orders in this territory. Total bookings of all sellers last week amounted to about 1250 tons, as compared with 2600 tons in the previous period and 1250 tons two weeks earlier. The emergency freight charges for interstate shipments have raised the price of iron about 17c. a gross ton delivered in the Brooklyn area and about 10c. per ton delivered at Newark, N. J. The State commissions of New Jersey and Pennsylvania have not yet approved the emergency rates for intrastate shipments.

Reinforcing Steel

There has been a slight increase in small-lot demands for bars and mesh, but tonnage business continues very scarce. Igoe Brothers will furnish 235 tons for pier No. 25 at New York, and additional requirements of the Triborough Bridge totaling 150 tons have been let to National Bridge Co. No new projects of any consequence appeared during the week. The emergency charges have lifted the carlot prices for rail and billet bars to 2.35c. and 2.50c., respectively, delivered on the job in this area.

Scrap

There are indications that more Japanese boats will be available for export shipments within the next month. Consequently, brokers are buying steels more freely and are more willing to take additional foreign commitments. At the present time, No. 1 and No. 2 steels are bringing $8.50 and $7 a ton respectively, alongside barge, and the prices for rail loading of these grades are nominally $1.50 lower. The domestic market on cast grades is slightly more active, with moderate shipments going to Coatesville and Harrisburg.

New Chemical Plant Begins Operations

THE new plant of the Carbide & Carbon Chemicals Corpn., located at Whiting, Ind., and occupying part of a 30-acre tract between the main lines of the New York Central and Pennsylvania railroads, has been placed in operation. Completion of this plant is an additional step in the development of the chemical industry in this country, this development having grown out of fundamental research in organic chemistry originally started to investigate the possibility of manufacturing new products from hydrocarbon raw materials. The corporation now produces a wide range of chemical products used extensively in industries requiring solvents and related products. The corporation's manufacturing facilities at South Charleston, W. Va., are also being enlarged.

Philadelphia District Operations at 32 Per Cent

Pennsylvania and New Jersey Have Not Approved Intrastate Emergency Freight Rates—Brokers Again Buy Export Scrap

PHILADELPHIA, April 23.—General miscellaneous steel demand is in unchanged volume, but this district is suffering from the lack of State highway demands which usually appear this time of the year. Both Pennsylvania and New Jersey are delaying projects in anticipation of Federal allotments; consequently the trade here is indisposed to count on any sizable awards of shapes or reinforcing steel until late in the second quarter. Sundry repair demands from the railroads are in somewhat better volume, but the total tonnage of material involved is still far from satisfactory. It is doubtful whether railroads will purchase rails in any volume during the remainder of the year since rather a large portion of last year's purchases has not yet been laid.

The smaller mills of this district are operating on schedules about equal to those of the previous week. Consequently the district rate is unchanged at 32 per cent. Light plate, sheets, spring wire and tin plate form the bulk of current mill tonnages, and there is little likelihood of heavier grades coming in in sufficient volume during the remainder of the quarter to lift the district very far above the present level.

District sales offices are notifying all consumers as to the price changes resulting from emergency freight charges on carloads and less carloads of finished steels. Neither New Jersey nor Pennsylvania has yet approved advances on intrastate shipments, but in this State it is expected these charges will be in force within the next fortnight.

Pig Iron

Average April sales of district furnaces are keeping pace with March bookings. Nevertheless, consuming demand is far from satisfactory, mostly as a result of poor steel foundry activity which in turn is a result of prolonged absence of railroad and shipbuilding purchases. Gray iron foundries continue to work on minimum schedules, using cheap cupola scrap in preference to pig iron. Some confusion still exists as to emergency freight rate applications. Contrary to previous reports, Pennsylvania has not yet approved the advances for intrastate shipments. Thus, Pennsylvania consumers can continue buying iron at previous price levels; New York furnaces will necessarily absorb the increased tariffs when selling in this district, if local selling prices are to be met.

Sheets and Strip

Full-finished grades continue in fair demand, with district mills offering three weeks' delivery on fresh business. Eastern Rolling Mill Co. is operating nearly 100 per cent on this grade, and is currently purchasing close to 800 tons of sheet bars each week. Lithographing concerns making oil cans, candy boxes, etc., from tin plate are buying this commodity in a volume about equal to that of last month. Stainless steel sheets continue in fair demand from a variety of small consumers. Neither blue-annealed sheets nor strips are in as good demand as sellers had expected.

Bars, Plates and Shapes

Reinforcing bars continue inactive, and alloy and merchant bars are still in poor demand. No plate business of any consequence appeared during the week. Joseph P. Cattie & Brothers, local galvanizers, have been awarded 400 tons of galvanized plates by the Navy Department, Washington, and will soon place this tonnage with a Pittsburgh mill. The current demand for shapes is far under that which the spring season warrants. Private purchases of small tonnages are more numerous, but political changes in Pennsylvania and New Jersey and a general withholding of projects in anticipation of Federal public works appropriations have resulted in a cessation of usual State highway demands. Frank M. Weaver, Lansdale, Pa., will furnish 120 tons of structural steel for a storehouse at Lakehurst, N. J. Active structural tonnages include 215 tons for a Westchester, Pa., Friends' home, and 175 tons for a Reading Railroad warehouse.

Warehouse Business

The average of warehouse bookings for all kinds of steel products is currently holding up to March volume and is somewhat better than business in the same month a year ago. No particular line is outstanding. Although no significant price revisions have been made, there are indications that galvanized sheets may be lowered in the near future.

Imports

The following iron and steel imports were received here last week: 1618 tons of pig iron from the Netherlands; 1500 tons of chrome ore from British India; 69 tons of structural shapes, 20 tons of steel bars and 18 tons of steel bands from Belgium; 68 tons of steel wire, 27 tons of steel bars, 21 tons of steel tubes and 5 tons of steel forgings from Sweden, and 65 tons of steel bands from Germany.

Scrap

The principal exporter has resumed shipments and is buying for Port Richmond. No. 1 and No. 2 steels for this point are now bringing $9.50 and $8.50 a ton, respectively. This resumption of export activity is based on the expected arrival of Japanese boats in the near future to relieve the heavy accumulations of scrap now stored on cars. In addition, it is believed that exchange difficulties with Italy will soon be settled, thus again opening up a large outlet for No. 2 steel. Domestically, the scrap market continues colorless. Claymont is purchasing occasional small lots of No. 1 at $10; Coatesville has broken a 2½-month silence and is now releasing shipments of No. 2 steel and heavy cast grades; and Phoenix is taking stove plate at about $8, but is temporarily disinterested in No. 2 steel.

Detroit Scrap Mart Grows Firmer

DETROIT, April 23.—Signs of firmness are appearing in the local scrap market. A recent sale by Chrysler direct to the local steel mill is not viewed as setting a precedent but rather as being an isolated case. Little material is moving out of Detroit by water as yet, although the lower Lakes have been navigable for several weeks. Prices are unchanged.

Output on Even Keel in South

BIRMINGHAM, April 23.—Production schedules for the major industries of the district are unchanged. At present, and for the near future, the schedule of steel production that went into effect on Feb. 12 will be maintained.

The Tennessee Coal, Iron & Railroad Co. has nine open-hearth furnaces in blast, and the Gulf States Steel Co. three. Based on ingot capacity, the district is producing at 55½ per cent.

Pig iron production is synchronized with steel output. There are nine blast furnaces in production in the district, five of them on basic iron and four producing for merchant consumption. Merchant producers, looking for an increased summer demand, are preparing, but have not scheduled, two additional furnaces for production.

Sales of wire products and sheets of various types continue satisfactory to the producers of the district. The sheet mill of the Tennessee Coal, Iron & Railroad Co. has been running at capacity for some time. Shipments of wire products were unusually heavy during the past week, attributable to jobbers' laying in stock in advance of the freight rate increase.

While sales of structural steel and other heavy shapes continue to lag, the number of announced public works projects that will draw material from this district has brightened prospects for increased demand for these products during the summer months.

Manufacturers of cast iron pressure pipe also are looking toward the public works program for a material increase in the consumption of their products.

Buffalo Trade Confused By Freight Surcharges

BUFFALO, April 23.—The increase in freight rates has been followed by improved inquiry for pig iron. Sales are steady and in fair tonnages. Inquiries are usually for immediate delivery. The increased rates, it is understood, will go into effect on all but one railroad, which is an Eastern road that is subjected to unusually severe truck competition. In the case of pig iron 7 per cent of the old rate is added as a surcharge.

The increase in freight rates has muddled the status of outstanding bids on finished material, particularly items like reinforcing bars. Some of these bids have been in effect from one to six months. These bids are now supposed to be increased from four-tenths of 7 per cent to 7 per cent of the old freight rate. Eventually the bidder spends three or four times that amount in extra work involved. Some manufacturers feel that the increase should be withdrawn on bids maturing during the next three months.

Two boatloads of scrap, comprising 8000 or 10,000 tons for two consumers, came into Buffalo during the past week. One of the cargoes was borings. The increase in freight rates is also causing some confusion on scrap shipments, with shipper and consignee in some cases having to split the increase.

An award of 205 tons of fabricated structural steel for a sanitarium in Deerfield, N. Y., a State job, was awarded to a New York fabricator.

WYCKOFF COLD DRAWN BARS

The Logical Specification ALWAYS for Rapid, Accurate, Automatic Screw Machine Production

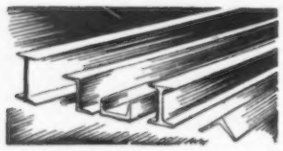
Logical because WYCKOFF Cold Drawn Bars are always uniformly machinable, unvarying in cross section and exact in size . . . every length is straight and true to your specification—with physical characteristics as constant as a laboratory formula.

Readily available in Rounds 3/16" to 6" inclusive . . . Squares 1/4 to 4" inclusive . . . Hexagons 1/4" to 3" inclusive . . . Flats 1/8" x 3/8" x 2" x 6" inclusive both in carbon and alloy grades.

WYCKOFF DRAWN STEEL CO.

General Offices: First National Bank Bldg., Pittsburgh, Pa.
Mills at Ambridge, Pa. and Chicago: Ill.
Manufacturers of Cold Drawn Steels
Turned and Polished Shafting Turned and Ground Shafting

Steel Output Holds at 52 Per Cent at Cleveland



Erie to Buy 23,000 Tons of Rails and Track Supplies—Inquiry for Construction Work Improves—Steel Scrap Advances

CLEVELAND, April 23.—With no decrease in business from the automotive industry and a good volume of miscellaneous orders, the demand for finished steel is holding to recent levels. Ingot output in the Cleveland-Lorain territory this week is unchanged at 52 per cent of capacity. Operations of finishing mills in northern Ohio show little change. Bookings of finished steel in April are not expected to show much decrease as compared with March. Makers of refrigerators and other household equipment continue to issue substantial releases, and the demand from the implement manufacturers is holding up surprisingly well.

In the construction field public work projects have increased and there are numerous other public projects and considerable railroad bridge work that are awaiting the allocation of Federal work relief funds.

The Erie Railroad, which recently issued an inquiry for an estimated 15,000 tons of rails, plans to purchase 17,851 tons of rails and 5235 tons of track material. To secure a $1,000,000 advance from the PWA for these purchases it has asked the Intrastate Commerce Commission for approval of a collateral note issue of that amount.

Ohio consumers are benefiting to some extent on products having Ohio basing points by the refusal of the State to apply on intrastate traffic the increase granted on interstate rail rates without a 30 days' notice. With Cleveland a basing point for bars and cold-rolled strip, freight rates for Ohio delivery have not been increased on these products. On the other hand, mills outside of Ohio shipping to this State products having a Cleveland basing point have more freight to absorb than heretofore. On plates and sheets sold on a Pittsburgh base and to which the new Pittsburgh rates apply Ohio producers, when shipping to Ohio points, now have an advantage because of the failure to advance the intrastate rate.

Bars, Plates and Shapes

Bars are moving in good volume to forge and other shops for automobile parts and to agricultural implement and road machinery manufacturers. Some of the implement manufacturers report that they are operating better now than at this time for several years, the usual season curtailment not yet being in evidence.

Considerable new inquiry has come out for steel for public works. Additional work in connection with the Muskingum district conservancy project for which bids will be taken shortly will require 900 tons of shapes and reinforcing bars. A Columbus bridge will take 800 tons of steel piling and 500 tons of reinforcing bars. Bids for a Cleveland housing project, requiring 1037 tons of reinforcing bars will be taken May 1.

The Diamond Alkali Co. has placed 640 tons of steel pipe. The Wheeling & Lake Erie Railroad is planning to extend the dock now under construction at Huron, Ohio, requiring an additional 500 tons of steel piling.

Pig Iron

New demand is being well maintained with most sales in small lots. Shipments this month are still ahead of March. One interest sold 4000 tons during the week as compared with 2000 tons the previous week. Most of the iron is going to the motor car industry. However, shipments to manufacturers of agricultural machinery and heating equipment continue good. Coke shipments this month are also ahead of those in March.

Sheets

There is a steady flow of new business from the automobile manufacturers who have not yet covered for all their May requirements. Stamping plants in this territory making automobile parts are very busy and are placing orders rather freely. Refrigerator manufacturers continue to maintain good production schedules, and there is no evidence of a letdown in the demand for sheets from this source. Miscellaneous demand is fair.

Strip Steel

Recent increase in orders from parts plants of some of the automobile companies has been maintained. Indiana subsidiaries of the General Motors Corpn. have placed additional orders for substantial tonnages of both hot and cold-

rolled strip. These plants have increased their schedules because of the stepping up of the production of Chevrolet cars. Miscellaneous demand is slightly more active.

Iron Ore

Consumption of Lake ore in March was 2,582,986 tons, an increase of 115,717 tons over February which is attributable to the longer month. In March last year consumption amounted to 2,189,566 tons. Furnace stocks April 1 were 22,362,331 tons, and ore at furnaces and on Lake Erie docks on that date was 26,931,629 tons, a decrease of over 2,000,000 tons from the same date a year ago when furnace and dock stocks amounted to 28,995,506 tons. Central district furnaces in March consumed 1,381,092 tons, an increase of 45,717 tons. Lake front furnaces used 1,194,667 tons, a gain of 67,681 tons, and all-rail furnaces melted 6177 tons, an increase of 1269 tons. Eastern furnaces, which used no Lake ore in February, consumed 1050 tons in March. There were 82 furnaces in blast using Lake ore April 1, a decrease of one for the month.

Scrap

The market has developed a slightly firmer tone, and steelmaking grades have advanced 50c. a ton, or more than the loss sustained a week ago. However, this advance has not yet been reflected in sales. A Youngstown consumer has purchased a small tonnage of No. 2 heavy melting steel at $10, and dealers are asking $11 for the No. 1 grade for delivery in that district. A Cleveland consumer has purchased a small tonnage of blast furnace scrap at $6.50. Dealers are asking $10.50 for No. 1 heavy melting steel for Cleveland delivery but state that mills are not offering above $10. Producers are unwilling to sell scrap, and dealers are finding it hard to buy at the recent prevailing prices. Another cause of the firmer price situation is the advance in freight rates which adds 25c. a ton to the cost of scrap shipped to the Youngstown district from Detroit.

Working Metals With Wood!

Sounds fantastic, but that's essentially what drop forgers do when they operate drop hammers. And what a tough job this is to expect of a piece of wood.

Obviously, just any kind of hammer board won't do. Keen discrimination is needed, and here the H. G. Irwin Lumber Co. can help you make the most satisfactory selection.

We recommend "Durock" Hammer Boards which are made of durable rock maple, carefully selected for exceptional toughness and straight grain. They have been patiently air-dried and scientifically cut for hammer service.

Try "Durock" Hammer Boards and see how they can "take it."

We furnish "Silveroc" hammer boards also made from Pennsylvania Rock Maple.

H.G.IRWIN
LUMBER CO.
ERIE, PA.
DUROCK
TRADE MARK

Pipe Tonnage to Be Placed on Coast

SAN FRANCISCO, April 22.—A pending contract for approximately 4000 tons of cast iron pipe involves the heaviest tonnage that has appeared this year and comes at a time when there is little movement. Bids are to be taken by the Los Angeles Department of Water and Power on April 26. Specifications call for 190,000 ft. of 6, 8 and 12-in. There are to be deliveries of 1326 tons in both June and July and 1294 tons in August. Additional pending cast iron pipe business includes 552 tons at Oakland, Cal., and 630 tons for two projects in Oregon.

Judson-Pacific Co. is reported to have booked 340 tons of structural steel for a State bridge in Plumas County, Calif. At Oakland, Calif., the East Bay Municipal Utility District awarded 300 tons of plates to Steel Tank & Pipe Co. Western Pipe & Steel Co. will furnish 243 tons of plates for tunnel linings at San Francisco. Award of a general contract is expected shortly at San Francisco on the Trans-Bay bridge distribution structure, which will require 3033 tons of reinforcing bars, 2800 tons of structural steel and 330 tons of pipe railing.

At Denver, Colo., bids are to be opened May 1 on the furnishing of 1327 tons of steel sheet piling and 450 tons of reinforcing bars for use on the Cherry Creek retarding dam. The Metropolitan Water District will open bids April 29 at Los Angeles for an unannounced tonnage of structural steel ribs and plates for use on the Colorado River aqueduct. Bids will be opened during the week on the Mad River dam and pipe line to be constructed near Eureka, Calif. Specifications call for 1300 to 2000 tons of plates and 500 tons of reinforcing bars.

Passage of the huge appropriation bill by Congress gives hope of an early start on many major Federal projects on the Coast. At the Puget Sound Navy Yard at Bremerton, Wash., plans have been completed for a new graving dry dock to cost $4,500,000 with auxiliaries and services. Additional funds may make possible the placing of approximately 3000 tons of steel sheet piling for the Coast Guard bulkhead to be constructed at Government Island, Calif. Extensive plans have been completed for work at the Pearl Harbor Navy Yard at Honolulu, T. H.

University Plans Welding Conference

THE department of mechanical engineering of the University of Wisconsin is sponsoring a welding conference, to be held at Madison, May 2 and 3. As at the previous conferences in 1928 and 1931, the demonstrations and discussions will be open to engineers, designers, and welding operators. The first day will be devoted to various phases of gas and electric welding equipment and welding material, and the second day to electric arc and oxy-acetylene welding method, including procedure in welding aluminum and other alloys. Exhibits will include all-welded farm structures.

Check the savings in set-up time alone that you can make on your multiple tool jobs with increased tool life of 29:1 on Cast Iron, 32:1 on Aluminum alloys, 36:1 on Brass, Bronze or Copper, 30:1 on non-metallic materials. Such savings are possible only with Carboloy tools due to their extreme hardness and resistance to abrasion. Then add to these savings the additional economy of increased speeds, closer tolerances, less grinding time and better finish. It is because of these savings—savings not possible with ordinary tools, that many of the nation's foremost industrial concerns are using Carboloy tools extensively throughout their plants.

Get full information on the benefits of Carboloy on your applications, and don't fail to include your multiple tool machining jobs.

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In Canada: Canadian General Electric Co., Ltd., Toronto, Ontario

CARBOLOY CEMENTED CARBIDES

Reg. U. S. Pat. Off.

Sheet Bookings Large In Southern Ohio

CINCINNATI, April 23. — A slight step-up in current automobile requirements, together with a well-sustained miscellaneous demand for finished sheets, has pushed total sheet bookings to about 75 per cent of mill capacity. Motor car builders are pursuing a conservative, almost hand-to-mouth buying policy, current ordering fluctuating in sympathy with retail automobile sales. Inventories of automobile manufacturers, as well as those of other sheet users, are low and any improvement in business will be reflected in sheet demand. Mill schedules are at about 75 per cent of capacity.

Changes in freight rates, effective in this area last Thursday on interstate shipments, are not expected to affect pig iron sales. The Ohio Utilities Commission has refused to allow the 7 per cent increase on intrastate shipments, but Southern furnaces indicate they will absorb the freight advance and maintain the present 38c. differential in this area. Southern Ohio foundry iron is still quotable at $19.51, delivered in Cincinnati, and Southern furnaces are offering the same grade at $19.13.

Stove, agricultural implement and specialty foundries catering to automotive and refrigerator business are enjoying good operations. Machine tool foundries are still slow.

Sellers of foundry coke in this district are marking time on quotations to allow the market to adjust itself to the recent advance in freight rates. As to Ohio ovens, the problem is one of raw material costs, since there is no advance on intrastate business. Ovens in interstate business, however, face a problem of higher delivery costs on coke, as well as raw material advances. It is expected the matter will be ironed out by the first of May.

The scrap market remains weak. While dealer's bids are unchanged, demand is light and published lists are nominal. Some material is moving on old contract and dealer's purchases are for application on commitments. Speculation is nil.

Freight Rate Situation Befuddled at Boston

BOSTON, April 23.—The freight rate situation so far as scrap is concerned is definitely settled, but for pig iron, other than Mystic, it is rather befuddled owing to the failure of some States to ratify the I.C.C. schedule, and also because of the competitive truck-and-water rate phase. It will be at least another week before the situation is clarified.

Pig iron sales the past week amounted to but a few hundred tons in odds and ends. There are no sizable inquiries. Some financially strong melters are talking about stocking pig iron in anticipation of inflation, but have made no definite plans.

Shipments of scrap to Pennsylvania consumers are practically nil. Low offers and higher freight rates are quieting factors. Shipments to Pittsburgh points now carry a $6.10 per ton freight and to eastern Pennsylvania $4.71. The American Steel & Wire Co., Worcester, Mass., is offering $7.50 a ton, delivered, for No. 1 steel, and $6.50 for No. 2, while local exporters are generally paying $8.50 a ton, delivered Army base, for No. 1, and $7.50 for No. 2. The export market therefore appears a little firmer, but is less active. Loading of export scrap at Providence, R. I., has been put off to around May 1, a delay of at least two weeks.

New England Coal & Coke Co. has dropped its price on spot domestic coke from $13 a ton, c.o.d., to $11.20, but has made no change in its foundry coke price.

Local warehouses probably will issue new price schedules within a week, showing a slight advance on a majority of items.

Fabricated Structural Steel

Lettings Decline—New Projects in Better Volume

STRUCTURAL STEEL AWARDS

NORTH ATLANTIC STATES

Boston, 300 tons, Army Base, to Kalman Steel Corpn.

Chicopee, Mass., 125 tons, garage, to Haarman Steel Co.

New York, 230 tons, hospital building, to Berkshire Iron Works.

New York, 300 tons, bridge in Bronx, to National Bridge Works.

Brooklyn, 255 tons, addition to public school No. 201, to Bethlehem Fabricators, Inc.

New York Central Railroad, 550 tons, bridge at Utica, N. Y., to McClintic-Marshall Corpn.

Deerfield, N. Y., 205 tons, sanitarium for State hospital, to Belmont Iron Works.

Delair, N. J., 155 tons, Kieckhefer box factory, to McClintic-Marshall.

Lakehurst, N. J., 120 tons, warehouse, to Frank M. Weaver.

Carnegie, Pa., 165 tons, Scott Township school, to Levison Steel Co.

Pittsburgh, 190 tons, canopies for Pittsburgh & Lake Erie Railroad, to Pittsburgh-Des Moines Steel Co.

THE SOUTH

Lynchburg, Va., 375 tons, plant additions for John H. Heald Corpn., to Virginia Bridge & Iron Co.

Louisville, Ky., 825 tons, whiskey warehouse for Bernheim Distilling Co., Inc., to International Steel Co.

Louisville, 380 tons, whiskey warehouse for Brown-Forman Distillery Co., to International Steel Co.

State of Georgia, 175 tons, highway bridge project NRM-403-E, to Virginia Bridge & Iron Co.

Broxton, Ga., 455 tons, State highway bridge, to McClintic-Marshall Corpn.

Howard County, Tex., 200 tons, bridge, to Pittsburgh-Des Moines Steel Co.

CENTRAL STATES

Kalamazoo, Mich., 318 tons, factory for Upjohn Co., to McClintic-Marshall Corpn.

Cleveland, 208 tons, four branch post offices, to Fort Pitt Bridge Works Co.

Elyria, Ohio, 400 tons, addition to Western Automatic Screw Co. plant, to American Bridge Co.

Elwood, Ind., 350 tons, Continental Can factory building, to an unnamed fabricator.

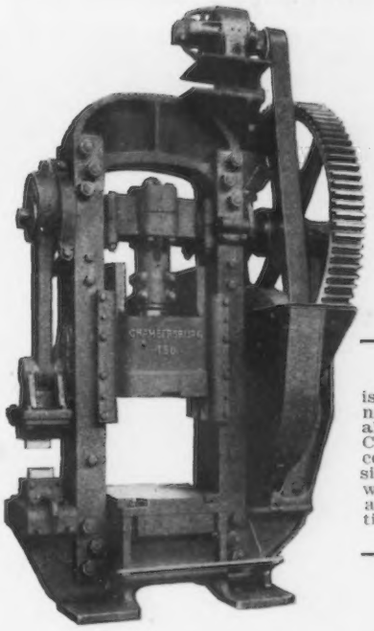
Evanston, Ill., 155 tons, State highway bridge, to McClintic-Marshall Corpn.

Chicago, 225 tons, International Harvester Co., to Worden-Allen Co.

Posey, Ill., 400 tons, bridge, to Worden-Allen Co.

Dubuque, Iowa, 375 tons, towers, to Pittsburgh-Des Moines Steel Co.

Chicago & Northwestern Railroad, 125 tons, bridge at Fond du Lac, Wis., to McClintic-Marshall Corpn.



CECOLLOY
is a synthetic nickel-molybdenum alloy developed by Chambersburg. It combines the tensile strength of steel with the vibration-absorbing properties of gray iron.

Sixty-three Cents a Month!

THE result of an investigation just completed, covering repair parts on a number of Chambersburg Trimming Presses with an aggregate service record of 2309 months, reveals an average repair part cost of 63 cents per month per press.
Now, with the added advantage of the use of Cecolloy in the construction of these presses, it seems logical that repair costs should drop even below this unusual record. The ruggedness of these presses, coupled with the fact that it is impossible to break them, or throw them out of alignment by overload or other abuse, is responsible for their growing success.
Compare your own costs, then write for catalog and details.

CHAMBERSBURG CECOLLOY PRESSES

CHAMBERSBURG ENGINEERING CO., CHAMBERSBURG, PA.

Wabash Railway, 240 tons, small spans in Missouri and Illinois, to American Bridge Co., Milwaukee Bridge Co. and Illinois Steel Bridge Co.

Fort Scott, Kan., 100 tons, post office, to Capital Iron Works, Inc., Topeka.

St. Louis, 170 tons, warehouse for Chevrolet Motor Co., to Mississippi Valley Structural Steel Co.

WESTERN STATES

Colton, Cal., 115 tons, crane runway for California Portland Cement Co., to McClintic-Marshall Corpn.

San Jose, Cal., 150 tons, Bird Avenue subway for Southern Pacific Railroad, to an unnamed fabricator.

Plumas County, Cal., 340 tons, State bridge over Feather River, to Judson-Pacific Co.

Almira, Wash., 500 tons, mixing plant at Grand Coulee dam, to S. C. Johnson Mfg. Co.

Kittitas County, Wash., 135 tons, State undercrossing near Ellensburg, to Wallace Bridge & Structural Steel Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

East Walpole, Mass., 200 tons, plant addition.

Catskill, N. Y., 550 tons, State highway bridge.

CARNEGIE ABRASION RESISTING STEEL AGAIN PROVES ITS SUPERIOR QUALITIES

On a recent dredging operation on the Columbia River, two kinds of dredge pipe were used. The engineer reports that:

After handling 3,000,000 cu. yds. of sand and gravel, the mild steel dredge pipe was worn through. The pipe made from Carnegie Abrasion Resisting Steel had merely been well polished.

This is a typical report from a user of Carnegie Abrasion Resisting Steel. In a wide variety of applications, results are consistently successful. *Your inquiries are solicited.* 323

CARNEGIE STEEL COMPANY • PITTSBURGH

United States Steel Corporation Subsidiary

Chelsea, N. Y., 400 tons, monastery for Our Lady of Isle.

Pittsburgh, 300 tons, addition to International Furniture Co. building.

Girard, Pa., 225 tons, building for Girard Model Works.

SOUTH AND SOUTHWEST

State of Texas, 425 tons, highway bridge in Comal County over Guadaloupe River.

San Antonio, Tex., 3500 tons, post office; A. W. Kutsche, Detroit, low bidder on general contract.

Verdigris, Okla., 600 tons, bridge.

CENTRAL STATES

Zanesville, Ohio, 200 tons, relocation transmission towers of Ohio Power Co., for Muskingum District Conservation project; bids to be taken by United States Engineers, Zanesville, about June 5.

Zanesville, 300 tons, Kearns-Gorsuch warehouse.

Sioux Falls, S. D., 200 tons, State highway bridge.

Waukegan, Ill., 1875 tons, sewage treating plant.

Chicago, 200 tons, packing house for Armour & Co.

Chicago, 200 tons, International Ink Co.; Austin Co., low bidder.

Des Moines, Iowa, 1500 tons, viaduct.

Des Moines, 350 tons, garage.

Booneville, Iowa, 300 tons, bridge.

Fort Dodge, Iowa, 800 tons, viaduct.

Columbus, Neb., 925 tons, bridge.

WESTERN STATES

Boulder Dam, 150 tons, four overhead cranes for intake towers; Judson-Pacific Co. low bidder.

San Francisco, 105 tons, girls' high school; bids open.

Sacramento, Cal., 100 tons, Montgomery, Ward building; bids soon.

San Francisco, 550 tons additional, Trans-Bay bridge distribution structure; Barrett & Hilp low bidders on general contract.

Eureka, Cal., 1600 tons, dam.

Pierce County, Wash., 179 tons, State underpass under Northern Pacific Railway; bids May 7.

FABRICATED PLATES

AWARDS

Trenton, N. J., 110 tons, two tanks for Socony-Vacuum Oil Co., to Chicago Bridge & Iron Works.

Bayonne, N. J., 165 tons, six tanks for Tide Water Oil Co., to Buffalo Tank Co.

Alkali, Ohio, 650 tons, 60-in. pipe and specials for Diamond Alkali Co., to National Tube Co.

Grand Haven, Mich., 350 tons, two dump scows, to McClintic-Marshall Corpn.

Kansas City, Mo., 150 tons, tanks for Standard Oil Co., to Graver Tank & Mfg. Co.

Longview, Cal., 1100 tons, tanks, to Willamette Iron & Steel Co.

Oakland, Cal., 300 tons, 24 and 30-in. pipe for East Bay Municipal Utility District, to Steel Tank & Pipe Co.

San Francisco, 243 tons, Crystal Springs tunnel linings, to Western Pipe & Steel Co.

NEW PROJECTS

Elmira, N. Y., 600 tons for pipe line.

Niagara Falls, N. Y., 500 tons for pipe line.

Vicksburg, Miss., 900 tons, 60 dredge pontoons; bids by United States Engineer Office.

Fort Peck, Mont., 535 tons, 21 and 28-in. dredge pipe; bids May 15.

SHEET PILING

AWARDS

Boston, 7000 tons, Army Base, to Kalman Steel Corpn.

St. Andrews Bay, Fla., 550 tons, to Inland Steel Co.

Milwaukee, 150 tons, breakwater, to Inland Steel Co.

Denver, 350 tons for Rye Patch dam, to an unnamed bidder.

NEW PROJECTS

Columbus, Ohio, 800 tons, Main Street bridge; bids May 9.

Denver, 1327 tons, for Cherry Creek retarding dam; bids May 1.

Pipe Lines

Royal Petroleum Corpn., 17 East Forty-second Street, New York, plans welded steel pipe line along West Avenue, county highway, Sewaren, N. J., for oil supply for new bulk storage and distributing plant.

Austin, Minn., plans steel pipe lines for municipal gas distribution. Special election is being arranged to vote bonds for project. F. R. Smith is city clerk.

Bureau of Reclamation, Denver, asks bids until May 3 for welded plate steel pipe lines with flange coupling bolts, gaskets and blind flanges for roof drainage system for Boulder power plant, comprising two headers, one with branches for Arizona wing and other with branches for Nevada wing, including welded fittings (Specification 677-D).

Continental Oil Co., Ponca City, Okla., has let contract to E. L. McCarthy, Tulsa, Okla., for new 4-in. welded steel pipe line from Oklahoma City to Ponca City, about nine miles.

Supervisor of Purchases, Subsistence Homesteads Division, Department of Interior, Washington, has low bids from Thomas Summerville, Washington, for 32,850 lin. ft. of 1-in. and 920 ft. of ¾-in. galvanized steel pipe for project at El Monte, Cal.

National Oil Co., Oil City, Pa., is considering steel pipe lines in connection with development of oil properties in Old Venango County oilfield, where new wells will be drilled.

Price, Utah, plans steel pipe line, with other metal pipe under consideration, in Price Canyon, replacing present wood and tile pipe for main water supply. Special election will be held April 26 to vote bonds for $156,000 for project.

Texas Company, Elizabeth City, N. C., plans three submerged steel pipe lines in Meherrin River, Murfreesboro, N. C., from new wharf to be built on south bank of stream to new bulk oil storage and distributing plant on north bank, for oil supply at latter point.

Heppner, Ore., will take bids May 6 on 210 tons of 8-in. steel pipe, alternates on cast iron.

PERSONALS

(CONTINUED FROM PAGE 43)

years has been engaged in development engineering work in the Bell Telephone Co.'s laboratories at the Western Electric Co. in Chicago.

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F. H. CHAPIN, president, National Acme Co., Cleveland, sailed a few days ago for Italy and will make an extended trip through Continental countries, England and Scotland.

❖ ❖ ❖

ROBERT M. LIPPARD, Heald Machine Co., has been elected president of the American Society of Tool Engineers, which has its headquarters in Detroit. FORD R. LAMB, Consolidated Machine Tool Corpn., has been named first vice-president; W. MAXWELL GRAY, Congress Tool & Die Co., second vice-president; B. L. DIAMOND, Duplex Equipment Co., treasurer; and ALBERT M. SARGENT, Pioneer Engineering & Mfg. Co., secretary.

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ALFRED G. GULLIVER has been named general manager of the transmission manufacturing plant of the Chevrolet Motor Co. at Toledo, Ohio. He has been general superintendent of operations for the Chevrolet company at its Flint, Mich., plant. He succeeds BERT CONWAY, who resigned because of ill health.

❖ ❖ ❖

JAMES T. PARDEE, vice-president and secretary of the Dow Chemical Co., Midland, Mich., has been elected chairman of the board to succeed the late A. E. Convers. LELAND I. DOAN, sales manager, has been made a director of the company.

❖ ❖ ❖

JUDD W. SPRAY has been elected executive vice-president of the Bower Roller Bearing Co., Detroit.

❖ ❖ ❖

A. L. LOTT, vice-president of Motor Products Corpn., Detroit, has been made president to succeed W. C. RANDS, who has submitted his resignation.

❖ ❖ ❖

JOHN P. SANGER, United States Gypsum Co., has been elected president of the Purchasing Agents Association of Chicago. Other officers elected are JOHN H. MOHR, first vice-president, John Mohr & Sons; second vice-president, R. W. MORRILL, Bowman Dairy Co.; secretary, FREDERICK J. HEASLIP, Fairbanks Morse & Co.; and, treasurer, A. JARMAN, Y. M. C. A. Newly elected to the board of governors are the following members: J. L. BURGESS, Educational Buyers, Inc.; A. V. PLEASANCE, Montgomery, Ward & Co.; C. E. WONDER, VanCleef Brothers; and K. W. MOORE, Chicago Title & Trust Co.

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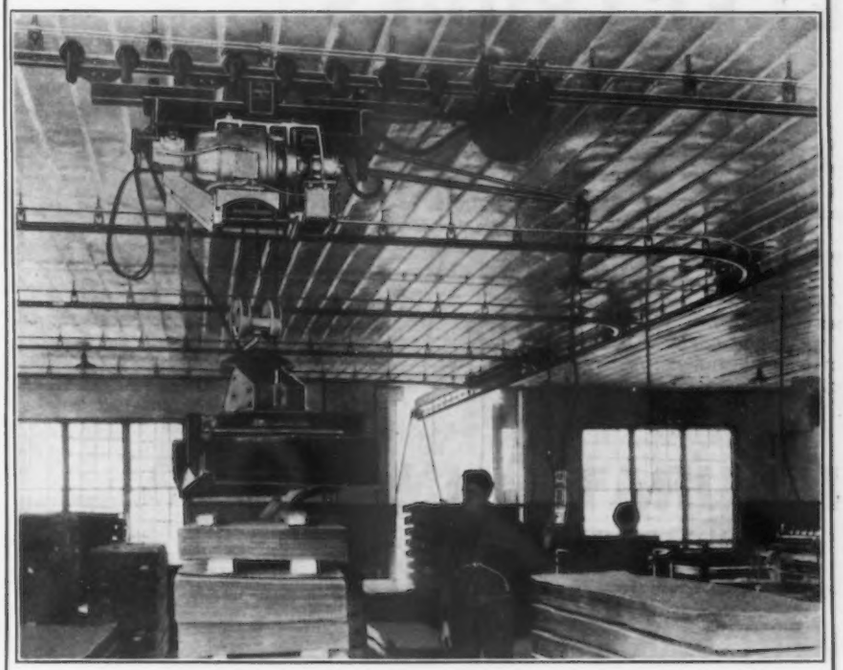
DR. R. M. BURNS, assistant chemical director, Bell Telephone Laboratories, New York, addressed the April 11 meeting of the Chicago chapter of the American Society for Metals, his subject being "Protection of Metals from Corrosion." At this meeting, the Chicago chapter initiated an experiment designed to widen the usefulness of the society and at the same time to open to it a large new field of membership. Honorary student memberships were conferred on 12 upper class engineering students from Armour School of Technology, Lewis Institute, Northwestern University, University of Illinois, and Valparaiso University.

PROGRESS— BETTER TODAY THAN YESTERDAY'S BEST!



Electrified system with Airwheel Tractor, Electric Hoist, and Electric Sheet Grab.

Material Handling Methods are rarely so good they cannot be made better. American MonoRail engineers, in tune with this fact of Progress, match their time against yours for a discussion that may open the way to new savings in plant transportation.

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Complete Overhead Rail Runway Systems.
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Hand or Power Operation. Standard units stocked for quick deliveries.
Quotations on materials alone or on systems installed ready for service.
Engineering service and distributors in principal cities. Complete catalogue on request.

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If you weld stainless alloys buy from the oldest company producing Alloy Electrodes exclusively and serving the world's leading steel producers and users. All popular analyses of chrome and chrome-nickel electrodes carried in stock.

MAURATH, INC.
7400 Union Ave., Cleveland, Ohio

Social Security Won't Be Obtained With a Steam Roller

(CONTINUED FORM PAGE 33D)

nue collected during the days of the "New Era."

"And yet," says Mr. Douglas, "we are told by the Administration that it contemplates spending at the rate of between $8,500,000,000 and $9,000,000,000. A gap of between $2,000,000,000 and $2,500,000,000! Even assuming (a highly improbable assumption to make) that we will experience in the near future a recovery and industrial production and employment of people equal that of 1919, how is the gap to be bridged?"

Chicken Counters Moved from New York to Washington

No exposition of the dangers lurking in present fiscal policy could be more pointed. It will be appreciated by business men at least, because they have learned, especially during the past five years, that one can't count his chickens before they are hatched. Nevertheless our largest business, the Federal Government, persists in just that kind of wishful prognosticating. Apparently the blind optimism of the New Era did not die in 1929. It merely changed its headquarters from New York to Washington.

Today admonitions of caution are shouted down, just as they were by the New Eracrats in the 20's. Those who try to restrain the Congressional steam roller are called, among other things, "calamity howlers." Such an epithet, applied to business men, is particularly inept.

Men of business never shout calamity. They can sell only when the buyer has enough confidence to buy. Consistently throughout the depression, they have adapted themselves as best they could to the order of the day, and it is to their credit that business volume is now as high as it is. Consumer goods, of many different kinds, are showing an astonishingly strong gain in demand —a tribute to the ingenuity of business men in improving their products and in overcoming the sales resistance of a depression-shocked public.

Business men will tell you that the country is now all set for a revival in capital goods if only Washington will "lay off" for a time. They may not know much about theoretical economics but they know the mental attitude of investors and of prospective buyers of equipment.

American business is by no means opposed to the general purposes of the Social Security bill. But it questions the desirability of hasty enactment of another tax-eating reform measure when another impediment to nascent recovery may prove crucial.

Unfavorable Precedents for Unemployment Insurance

As between the pension and unemployment compensation provisions of the bill, business sentiment is more favorable to the former than the latter. Though the *World Telegram* states that this country is 50 years behind Europe in establishing a social security system, compulsory State unemployment insurance abroad dates back only to 1911, when the British law was enacted. Since the original British act was passed, it has been altered 24 times. The insurance fund that was accumulated proved inadequate and deficits were made up by borrowing from the British Treasury. Finally indebtedness to the Government reached $559,647,500, which exhausted the borrowing power of the fund up to the statutory limit. Subsequent deficits had to be made up by appropriations from the British Treasury out of current revenue.

In Germany, a compulsory unemployment insurance law was enacted in 1927. German experience was similar to that of Great Britain. On Jan. 15, 1935, the German Government officially abolished unemployment insurance.

Are Foreign Mistakes to Be Repeated?

The lessons from this foreign experience are that unemployment is not an insurable risk and that unemployment compensation is not a remedy for depressional unemployment. Hence an unemployment compensation law should aim at the stabilization of employment in what might be considered normal times. In other words, the provisions of the act should give employers an incentive to provide steady work.

Does the Social Security bill do this? On the contrary, it follows the example of the discredited European systems in levying uniform taxes and pooling the revenues in a common fund. Under such a plan an industry or company that operates intermittently, and periodically dumps its employees on the community, is really subsidized by other industries or by competitors in its own industry that operate more steadily. Experience in England, according to the minutes of the British Royal Commission, shows that a great majority of British industries with 7,800,000 workers were distinctly profitable to the fund, that seven industries with 2,700,000 workers were only slightly unprofit-

able, and that six industries with less than 2,000,000 workers were highly unprofitable, the last named drawing out annually $48,665,000 more than they paid in.

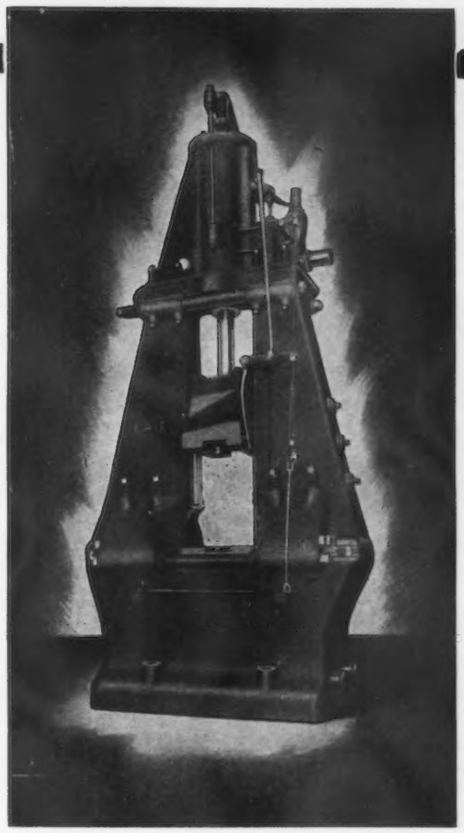
To prevent such a situation from arising, in other words to encourage each industry and each company to stand on its own feet, the State of Wisconsin enacted an unemployment compensation law which provides that each employer build up his own reserve fund. The State and employees make no contribution. When the specified reserves per employee have been accumulated, the employer may discontinue contributions to the fund. Obviously it is to his interest to eliminate unemployment so far as management can make that possible so that the reserve fund can be protected from dissipation. The fund, it will be noted, belongs to the employer subject only to necessary payments of unemployment benefits. This is true whether the fund is kept in special trusteed form or deposited with the State for investment.

The incentive to employment stabilization which is inherent in the individual industrial reserve is entirely overlooked in the Social Security bill. In fact, individual reserves are specifically barred.

Individual reserves are especially desirable because they insure the use of funds for the purposes for which they were intended. They eliminate the chance of large deficits and expenses that must be absorbed by the taxpayer. Pooled reserves, on the other hand, open the door to possible political raids on the fund and to the piling up of heavy bureaucratic costs in administration.

These and other considerations account for the attitude of business men toward the Social Security bill. They believe that there should be a careful weighing of all possible consequences of the measure before it is presented for final enactment. Undue haste is unnecessary, and might prove costly. Social security won't be obtained with a steam roller.

The Law Compels You To Pay for This Hammer



Is the Type G ERIE Steam Drop Hammer at work in your forge shop? If not—if you are making your drop forgings on antiquated hammers—you are paying for this hammer, paying in repair and maintenance costs, in low production and loss of production, in increased labor cost.

The ERIE Type G will more than earn its way in any shop, and if it is not working for you, you are paying for it nevertheless, compelled to pay by the inexorable laws of obsolescence and competition which are not subject to review by any Supreme Court.

Let these hammers work for you; get what you are paying for. Write us for complete information on the sizes in which you are interested.

ERIE FOUNDRY COMPANY, ERIE, PENNA., U. S. A.

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PARIS, FRANCE: 8 RUE DE ROCROY

ERIE

Chicago Iron and Steel Market

(CONTINUED FROM PAGE 57)

They include 8000 tons for a post office at St. Louis and about 2000 tons for a sewage treating plant at Waukegan, Ill. A Detroit contractor is low bidder on 3500 tons for a post office at San Antonio, Tex. Awards are light at 4100 tons.

Scrap

Delay by various States in establishing the new freight rates on intrastate movements is causing confusion and some ill feeling. The new switching rates in Illinois have been temporarily set aside but some transfer points are just over the line in Indiana, and cases arise where scrap bought in Illinois but carried over the line for transfer in Indiana and returned to an Illinois mill comes under interstate rules, taking the higher rates. The higher rates on movements from out of Illinois are checking the flow of scrap, and local supplies are drying up.

Jones & Laughlin Loss Reduced

THE Jones & Laughlin Steel Corpn., Pittsburgh, and subsidiaries, in the quarter ended March 31, had a total loss of $794,789 after all operating expenses, depreciation and bond interest. This compares with total loss of $1,924,524 in the first quarter of 1934.

Results Are What Count

If you want real economy—look to results rather than to first cost. It is on this basis that "HERCULES" (Red-Strand) Wire Rope continues to make and hold friends. There are reasons, of course, why this wire rope is so dependable and long lasting, and we are always glad to give full details to everyone interested in saving money. Made in a wide range of constructions including Round Strand, Flattened Strand, Preformed, Non-Rotating and Steel Clad types.

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A. Leschen & Sons Rope Co.

ESTABLISHED 1857

5909 Kennerly Avenue, St. Louis, Mo.

NEW YORK—CHICAGO—DENVER—SAN FRANCISCO

Republic Develops "Double Strength" Steel for Railroad Applications

(CONTINUED FROM PAGE 44)

They might be called the ferritic alloys.

Carbide Group	Ferritic Group
Carbon	Copper
Manganese	Nickel
Chromium	Molybdenum
Tungsten	

Silicon and phosphorus are not strictly in either class, as phosphorus does not combine with carbon but forms an analogous compound (Fe_3P), iron phosphide, which increases strength at the expense of ductility. Silicon in excess of 0.25 has a strengthening effect but lessens ductility.

The carbide group when added to the regular steel increases the strength by increasing the percentage of Fe_3C, iron carbide. This constituent is governed in the intensity of its effect by the rate of cooling of the metal through the critical range in the last process of fabrication. This produces what is called the air-hardening effect. This air-hardening effect is to be avoided in sheet and strip products as well as in welded plates, for the reason that different gages of sheet and plate—rolled from the same heat—when cooling from the normalizing heat will show considerable difference in physical properties. This condition, when carried out to produce steels strong enough to carry 50 per cent to 100 per cent more stress than the present analysis, will require considerable difference in the amounts of alloys required to produce the same range of properties in gages from 20-gage sheet to ¼-in. plate. On this account this type of alloy steel carries in its analysis a world of grief for the steel producer as well as for the fabricator, as has already been proved.

Copper Raises Yield Point

The ferrite alloys dissolve in the iron matrix and strengthen the basic part of the metal itself. Of these alloys, copper, when above 1.0 per cent, has the effect of raising the yield point of the steel without as much effect on the ultimate strength, and very little reduction in elongation. Tests made on regular production sheets of the copper-nickel-molybenum steels show an average yield point of 80 to 90 per cent of tensile strength and 30 to 35 per cent elongation in 2 in. The addition of 1.40 per cent copper, 0.75 per cent nickel and 1.07 per cent molybdenum to a steel with 0.08 carbon and 0.70 manganese has produced in normalized sheets (14 gage) a yield point of 70,000 lb. per sq. in., an ultimate strength of 80,000 lb. and elongation 30 per cent in 2 in. This same sheet after tempering at 950 deg. F. for 1 hr. showed 95,000-lb. yield point, 100,000-lb. tensile, and 25 per cent elongation in 2 in. From this same heat a ½-in. plate after normalizing showed 65,000-lb yield point, 74,000-lb. tensile, and 50 per cent elongation in 2 in. on the 1½-in. x 2-in. gage length test.

Elongation in 8 in. was 31 per cent. The Izod value was 76 ft.-lb. The longitudinal physical properties of the ½-in. plate after tempering at 950 deg. F. were 89,000-lb. yield point, 99,000-lb. tensile, and 35 per cent elongation in 2 in., 26 per cent elongation in 8 in., and 85 ft.-lb. Izod. This is an exceptionally tough condition considering the yield point and tensile strength of the steel. Without the copper, nickel and molybdenum addition, this carbon and manganese would not show much over 32,000-lb. yield point and 52,000-lb. tensile in the ½-in. plate, and 38,000-lb. yield point and 56,000-lb. tensile in the normalized 14-gage sheets.

The copper is added for increasing yield point and improving rust resistance. The nickel combines in the iron with the copper and has a great toughening effect, increasing the Izod or shock resistance of the steel. The molybdenum has the effect of holding both the copper and nickel in solution in the iron. Reheating in fabrication has very little effect on microstructure or physical properties.

Common Practice

Common practice is to design to a unit stress of 16,000 lb. and to use 32,000 lb. as the yield point for structural grades of steel. This is a relationship of two to one, as yield point equals twice the calculated stress. With increased speeds the kinetic energy increases in the order of the square of the velocity in ft. per sec., and it is recommended that for safety's sake the factor should be increased to at least 2½ to 1, such as a 40,000-lb. yield point for a 16,000-lb. stress. On this basis a structure reduced one-third in thickness would develop around 24,000-lb. unit stress and a 60,000-lb. minimum yield point should be required in the metal. A 40 per cent reduction in gages would develop 26,600-lb. stress and require 66,600-lb. yield point, and a 50 per cent reduction develops a 32,000-lb. stress and should have a minimum 80,900-lb. yield point steel.

These yield points and several even higher are being commercially produced in Republic Double Strength steel, and are being applied in various forms of transportation equipment. Some of these units have already been in drastic service for more than a year without a failure to date.

OBITUARY

ROBERT C. LIND, founder and president of the Rockford Machine Tool Co., Rockford, Ill., whose death on April 13 was mentioned in last week's issue, was born in 1856 and came to Rockford from Smoland, Sweden, with his parents in 1871. He began his industrial career at the age of 16 and rapidly advanced, becoming at the age of 29 the secretary of one of Rockford's larger furniture companies. Later he became interested in other local industries, including the machine tool company which he founded in 1905 and served as president until his death.

❖ ❖ ❖

CHARLES H. READ, one of the organizers of the Duquesne Steel Co., now part of the Carnegie Steel Co., died at Los Angeles on April 12, aged 88 years. In 1879 he was engaged in the steel casting business under the firm name of Read & Thaw. When the company later removed to Johnstown, Pa., Mr. Read became assistant general manager of Cambria Iron Co. In 1885 he was active in organizing the Duquesne Steel Co., Duquesne, Pa., which later was sold to the Allegheny Bessemer Steel Co., and subsequently to the Carnegie Steel Co.

❖ ❖ ❖

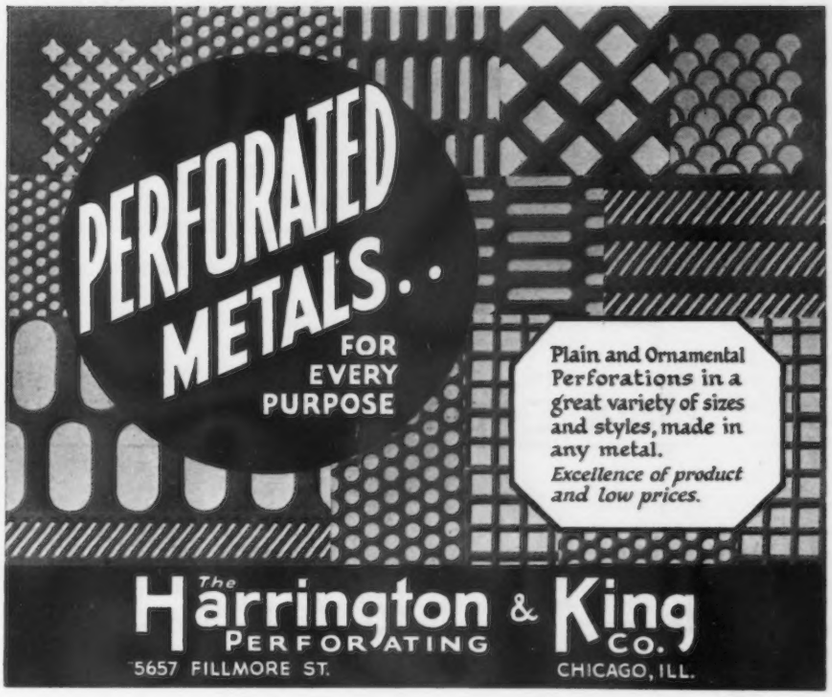
FREDERICK L. PIERCE, one of the founders of Cutler-Hammer, Inc., Milwaukee, died April 16, aged 74 years. He was born in Milwaukee on July 8, 1860, and with Frank R. Bacon, established the American Rheostat Co. in 1897. This became the nucleus of the present company. After serving many years as treasurer, Mr. Pierce became vice-president and later chairman of the board. He was a trustee of the Northwestern Mutual Life Insurance Co., Milwaukee.

❖ ❖ ❖

EDWARD M. MCILVAIN, formerly president of the Bethlehem Steel Co., died in New York on April 18, aged 71 years. He became identified with the old Bethlehem Iron Co. in 1898 as general sales manager and served as president from 1901 to 1904.

❖ ❖ ❖

GEORGE W. NIBBE, who since September, 1930, had been in the railroad sales department of the Inland Steel Co., died suddenly on April 3, while on a Chicago & North Western suburban train. Prior to his connection with the Inland Steel Co., he had been for a number of years with the Railroad Supply Co. and at a later date with the Lundie Engineering Corpn.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Michigan Foundrymen To Meet at Lansing

HIGH test cast iron will be the theme of a three-day sectional meeting of the American Foundrymen's Association, cooperating with the Detroit Foundrymen's Association and Michigan State College, at East Lansing, Mich., May 9, 10, and 11.

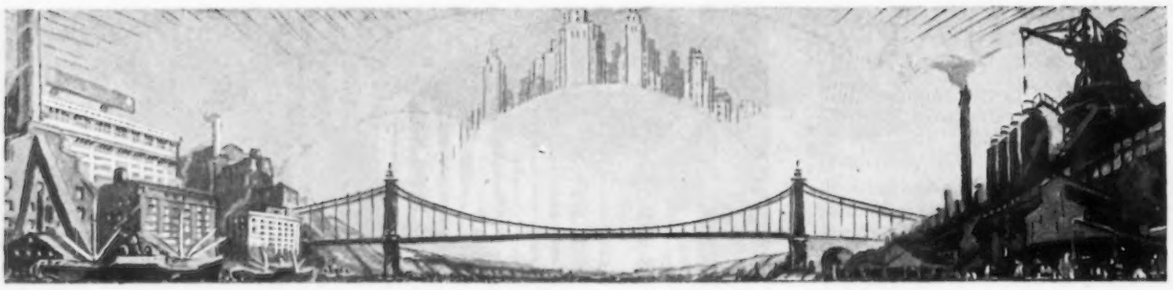
This meeting will be similar in nature to the short courses which have been held in past years at Michigan State College. The committee, composed of representatives of the three organizations, has worked up a program assuring valuable conferences on a subject which is becoming of greatest interest.

Among papers scheduled are the following: "Fundamental Aspects of Cast Iron," W. H. Spencer, Sealed Power Corpn., Muskegon, Mich.; "Superheating Cast Iron," F. G. Sefing and M. F. Surls, Michigan State College, East Lansing; "Alloy Cast Irons," E. K. Smith, Electro Metallurgical Co., Chicago; "Spectroscopy," Dr. E. J. Martin, General Motors Research Laboratory, Detroit; "Practical Aspects of Founding High Test Cast Iron," W. R. Jennings, Ecorse Foundry Co., Ecorse, Mich.; "Heat Treating Cast Iron," H. Bornstein, Deere & Co., Moline, Ill.; "Mechanics of Cast Iron," J. W. Bolton, Lunkenheimer Co., Cincinnati, and "The Foundry of 1950," F. J. Walls, International Nickel Co., New York.

Metal Trades Group To Meet at Cleveland

THE thirty-seventh annual convention of the National Metal Trades Association will be held at the Hotel Cleveland, Cleveland, May 15 and 16. Among the subjects which will be discussed are: "Appraisal of the NRA," "Practical Treatment of Industrial Relations Problems," "Prosperity and Social Security," "The Trend at Washington," "The Economics of the New Deal," "Americanism and Communism," and "Where Do We Go from Here?"

Revere Copper & Brass, Inc., New York, will remove its Boston office from 250 Stuart Street to the United Shoe Machinery Building, 138-164 Federal Street, effective April 26.



Plant Expansion and Equipment Buying

Machine Tool Sales Limited to Small Orders—New Inquiry Still Large

WHILE machine tool sales in the last week have been limited to small orders, the total volume has been satisfactory in the aggregate. A number of builders report a considerable improvement over the corresponding March totals, and new inquiry is holding up remarkably. While there is still a hesitancy to place orders on the part of some buyers, the fact that they are actually figuring on improvements is encouraging.

Activity in the automotive industry is centered on the purchases of the French Ford organization, representatives of which are said to be engaged in active negotiations in this country. It is believed that about $1,000,000 will be spent on equipment purchases. Other automobile makers are beginning to make plans for their 1936 models, but tool purchases will not likely begin for several weeks.

◀ NORTH ATLANTIC ▶

Continental Can Co., 1 Pershing Square, New York, has asked bids on general contract for new plant at Elwood, Ind., where 8-acre tract was recently acquired. Cost about $400,000 with equipment. Battey & Kipp, Inc., 231 South La Salle Street, Chicago, is consulting engineer.

Jacob Ruppert Brewery, 1639 Third Avenue, New York, has acquired Ehret Brewery property on adjoining site, totaling about 150,000 sq. ft., with multi-story buildings, idle for several years. New owner will remodel, and install new machinery. Cost over $750,000 with equipment.

Montauk Iron & Steel Corpn., 11 West Forty-second Street, New York, has filed plans for new one-story plant, 150 x 220 ft., on Borden Avenue, Long Island City, for storage and distribution. Cost about $35,000 with equipment.

American Oil Co., 122 East Forty-second Street, New York, has plans for new bulk oil storage and distributing plant at East Greenbush, N. Y., including steel tanks, loading and other facilities. Cost over $150,000 with equipment.

Signal Supply Officer, Army Base, Brooklyn, asks bids until April 29 for shielded power equipments (Circular 116); until May 6, 2500 pliers (Circular 117), 24 to 36 miles rubber-jacketed submarine cable (Circular 115), 73,000 ft. telephone cable and 39 reels (Circular 118).

Union Carbide & Carbon Corpn., 30 East Forty-second Street, New York, has let contract to Virginia Bridge & Iron Co., Roanoke, Va., for additions to plants at South Charleston and Alloy, W. Va.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 30 for genuine wrought iron welding elbows (Schedule 4831); until May 3, wrought iron pipe (Schedule 4841), 1,000,000 lb. medium black steel plates (Schedule 4887); until May 7, brass pipe (Schedule 4851), seven air ejectors and after condensers (Schedule 4850), all for Brooklyn, Philadelphia and Charleston navy yards.

General Instrument Corpn., 225 Varick Street, New York, manufacturer of radio condensers and kindred products, has leased about 28,000 sq. ft. in factory at 431 West Pershing Road, Chicago, for new branch plant.

Schenley Distillers Corpn., 20 West Fortieth Street, New York, has taken over six-story building at 534-36 West Fifty-eighth Street, about 35,000 sq. ft. floor space, for new rectifying plant, with part of building for storage and distribution.

Board of Education, Monticello, N. Y., plans manual training department in new two-story high school, for which superstructure will soon begin. General contract has been let to William L. Crow Construction Co., 101 Park Avenue, New York. Cost over $300,000 with equipment.

Eastern Industries, Inc., Harrison, N. J., manufacturer of industrial chemicals, etc., has leased one-story building, about 10,000 sq. ft. floor space, for new factory branch, storage and distributing plant.

Board of Education, Medford Township, Medford, N. J., and school boards of Lumberton, Easthampton, Westhampton, Hainesport and Shamong Townships, plan manual training department in new joint high school to serve all districts noted. Cost $275,000 with equipment. Kafes & Riegel, 137 East State Street, Trenton, N. J., are architects.

Commanding Officer, Frankford Arsenal, Philadelphia, asks bids until April 29 for one pedestal comparator and measuring machine (Circular 355).

Department of Public Works, City Hall Annex, Philadelphia, asks bids until April 30 for embossed sheet steel traffic signs, posts and brackets, etc. Frank H. Caven is director.

Hobart Mfg. Co., Troy, Ohio, manufacturer of electric-operated food preparing machines, washing machines, etc., and subsidiary, Dayton Scale Co., Dayton, Ohio, have leased site at 912-14 Girard Avenue, Philadelphia, for erection of new factory branch, storage and distributing plant.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 3 for 200 aircraft oxygen regulators (Schedule 4849); until May 7, 200 aircraft turn and bank indicators (Schedule 4908), for Philadelphia Navy Yard.

◀ WESTERN PA. DIST. ▶

Pittsburgh Plate Glass Co., Grant Building, Pittsburgh, has authorized an appropriation of $1,905,000 for plant expansion and improvements, in addition to work previously approved to cost $4,580,000. Considerable part of new expenditure will be used at branch plant at Crystal City, Mo., for safety glass production, recently referred to in these columns.

Pittsburgh Steel Drum Co., Oliver Building, Pittsburgh, is planning early removal of branch plant at Apollo, Pa., to a new location, where increased facilities will be provided.

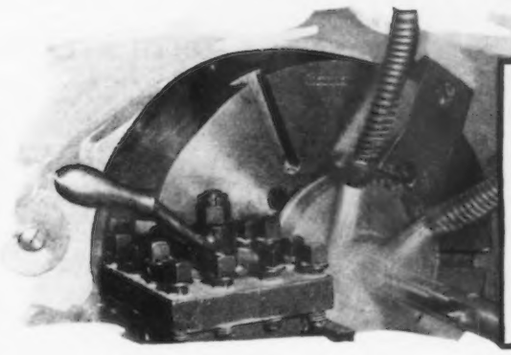
Hookless Fastener Co., Meadville, Pa., manufacturer of metal slide fasteners and kindred metal goods, has leased silk mill of H. R. Mallinson & Co., Inc., Erie, Pa., consisting of three buildings totaling 100,000 sq. ft. floor space, and will convert for new branch factory. Proposed addition to Meadville plant, previously referred to in these columns, will not be built at this time. Erie works will cost over $100,000 with equipment.

◀ NEW ENGLAND ▶

Bird & Son, Inc., East Walpole, Mass., manufacturer of roofing and building board products, pressboard, etc., has plans for new one-story and basement plant in Norwood district. Cost about $35,000 with equipment. Charles T. Main, Inc., 201 Devonshire Street, Boston, is consulting engineer.

Board of Education, Nashua, N. H., plans manual training department in new two-story junior high school. Cost about $530,000 with equipment. William E. O'Neill, 130½ Kinsley Street, is architect. Earl Tracey is superintendent of schools.

AN AID TO SECURING FULL CAPACITY OF LATHES



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DEEPER CUTS
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are made possible

COMPLETE flexibility, fast metal-removing capacity and ease of operation are embodied in the modern turret lathe. It is a profitable unit for rapid, accurate production of duplicate work, yet gives flexible utility when the machining of a single part is necessary.

SUNOCO Assures Dependable Lathe Performance

Proper tool equipment and its efficient arrangement are necessary in lathe operation, but the cutting lubricant is likewise a vital factor.

With Sunoco Emulsifying Cutting Oil, tool steel, carboloy and tantalum carbide small tools can take deep cuts at surface speeds that utilize the full capacity of the lathe.

Lathe Operators Like SUNOCO

Operators appreciate the advantages of Sunoco . . . it permits increased machine speed, longer runs per tool grind, less lost time in setting up, greater accuracy, better finish and fewer rejects throughout a long run.

It will pay you to get the facts on Sunoco and to test it in your plant. Your correspondence is invited . . . and the services of our cutting oil engineers—of wide experience—are at your disposal.

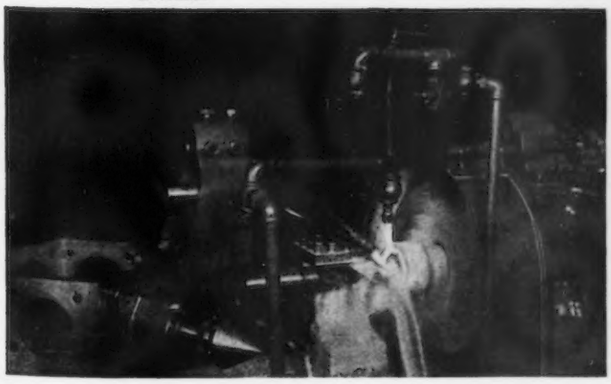
Operation: Turning and drilling gear cluster.
Machine: Warner & Swasey 3-A Turret Lathe.
Material: S. A. E. 1020
Turning: 160 S. F. P. M.
Drilling: 90 S. F. P. M.
Lubricant: 1 part Sunoco to 15 parts water

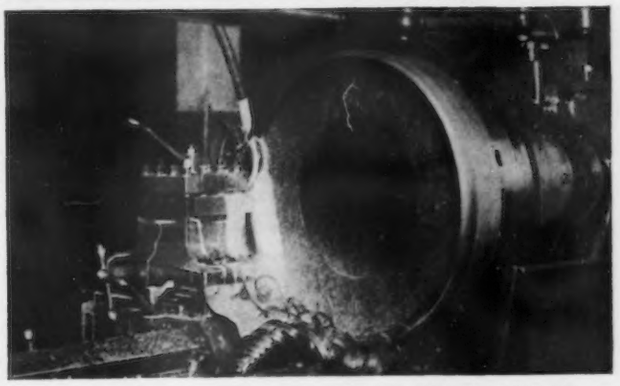
Courtesy of
Warner & Swasey Co.
Cleveland

SUNOCO
EMULSIFYING
CUTTING OIL

Operation: Turning and facing Bull Gear.
Machine: Warner & Swasey 5-A Turret Lathe.
Material: Manganese Steel Casting.
Facing: 140 S. F. P. M.
Lubricant: 1 part Sunoco to 15 parts water.

Courtesy of
Warner & Swasey Co.
Cleveland





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Dodge Chemical Co., 1171 Tremont Street, Boston, manufacturer of industrial chemicals, etc., has leased six-story building at 656 Beacon Street, totaling 25,000 sq. ft. floor space, for new plant.

Waterbury Metal Stamping Co., Waterbury, Conn., has been organized by Lester Zell and Henry Mills, Waterbury, to manufacture metal stampings and allied products.

Board of Selectmen, Newburyport, Mass., plans manual training department in new two-story high school. Cost about $400,000 with equipment. Edwin S. Dodge, 148 State Street, Boston, is architect.

Water Department, Lowell, Mass., T. P. McDermott, superintendent, will soon take bids for pumping machinery and accessories. Metcalf & Eddy, Statler Building, Boston, are consulting engineers.

◀ BUFFALO DISTRICT ▶

Consolidated Aircraft Corpn., 2050 Elmwood Avenue, Buffalo, has let general contract to L. B. Norman, 1034-B Seventeenth Street, Santa Monica, Cal., for new plant on 22-acre tract at San Diego, Cal., comprising part of Lindbergh airfield. Initial works will consist of one-story units, totaling 300 x 900 ft. in all, for parts production and assembling. Company will remove Buffalo works to new location, where manufacture will be concentrated in future, and will carry out this transfer early in August. Cost over $400,000 with equipment. Major Reuben H. Fleet is president.

Brocton Preserving Co., Brocton, N. Y., has let general contract to Concrete Steel Co., Durston Building, Syracuse, N. Y., for new one-story food processing and canning plant. Cost close to $35,000 with equipment. W. L. Schulenberg, Fredonia, N. Y., is engineer.

Vandalia Chemical Co., Vandalia, N. Y., manufacturer of industrial chemicals, etc., plans rebuilding part of plant recently destroyed by fire. Loss about $30,000 with equipment.

Common Council, City Hall, Lockport, N. Y., asks bids until April 29 for new municipal incinerator plant, consisting of two 40-ton units, with furnaces and accessory equipment, loaders and other mechanical-handling equipment. Nussbaumer & Clarke, Inc., 327 Franklin Street, Buffalo, N. Y., is consulting engineer.

◀ SOUTH ATLANTIC ▶

Nantahala Power & Light Co., Bryson City, N. C., plans new power transmission line from Cashiers, N. C., to Lake Sapphire district, with substation facilities and distributing lines in latter area. Cost close to $50,000 with equipment.

Warren Co., 905 Fair Street, Atlanta, Ga., manufacturer of refrigerators, parts, etc., plans rebuilding part of plant recently destroyed by fire. Loss over $100,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 3 for two industrial wheel-type tractors (Schedule 4881) for Pensacola, Fla., Navy Yard.

Central of Georgia Railway, Atlanta, Ga., plans new warehouse and terminal at slip No. 2 at Savannah, Ga., with installation of crane, hoists, conveyors and other mechanical-handling equipment. It will replace a unit recently destroyed by fire. Cost close to $200,000 with machinery.

Southern Packing & Canning Co., 226½ West Market Street, Greensboro, N. C., has taken over building on Commerce Street, and will remodel for new food products canning plant. Cost over $25,000 with machinery.

◀ MICHIGAN DISTRICT ▶

North American Pulp & Paper Corpn., Phoenix, N. Y., formerly North American Paper Corpn., has purchased former plant of Cheboygan Paper Mill, Cheboygan, Mich., and will remodel for production of tissue paper specialties, converting from a two-machine to three-machine plant. Cost over $70,000 with machinery. J. A. Massel will be general manager at mill.

Montague Casting Co., Montague, Mich., recently organized by Ernest Hageline, John Kalk, Montague, and associates, has taken over plant of Montague Iron Works for production of iron castings. D. M. Webster is vice-president and engineer.

Valley City Brewing Co., Grand Rapids, Mich., plans two-story addition and improvements to brewery on Leonard Street, including new equipment. Cost close to $60,000 with machinery. Company was organized recently to take over Old Kent Brewing Co. and plant. C. B. Pfeiffer is president.

Modern Stamping & Mfg. Co., 227 Iron Street, Detroit, has been organized by John C. Aldridge, 6164 Yorkshire Road, and associates, to manufacture sheet metal stampings and kindred specialties.

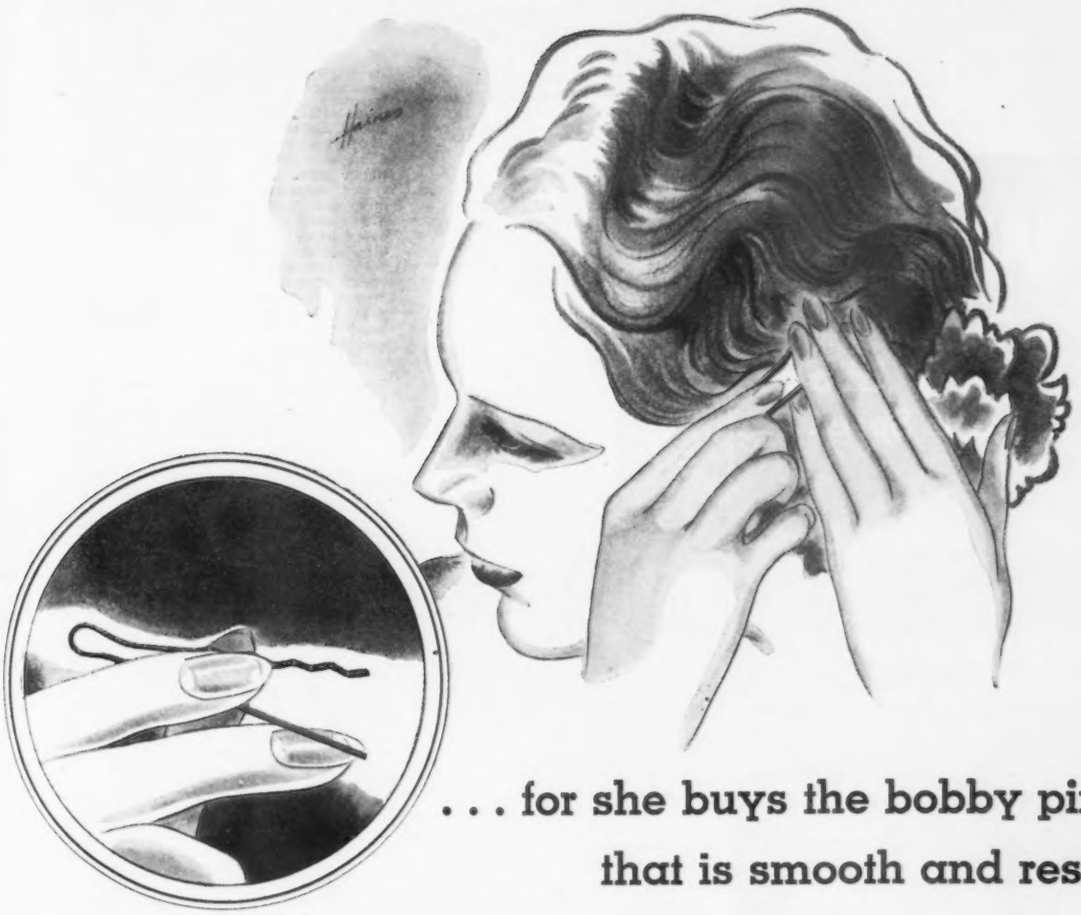
Michigan Bakeries, Inc., Muskegon, Mich., has authorized expansion and improvements, including new traveling ovens, boilers and other equipment. Cost about $45,000 with machinery.

◀ MIDDLE WEST ▶

Kleinschmidt Laboratories, Inc., 222 West North Bank Drive, Chicago, manufacturer of electrical products, has let general contract to Sides Construction Co., 840 Rush Street, for new one-story plant, 74 x 74 ft., at Highland Park. Cost about $25,000 with equipment. Mayo & Mayo Architects, Inc., 1 North La Salle Street, is architect.

Amalgamated Roofing Co., 6620 South Central Avenue, Chicago, roofing products, has let general contract to McKeown Brothers Co., 609 West Jackson Boulevard, for one-story addition to clearing plant, primarily for storage and distribution. Cost about $25,000 with equipment.

SHE DICTATES WIRE SPECIFICATIONS



. . . for she buys the bobby pin that is smooth and resilient

True round blunt points, perfectly smooth edges, attractive and smooth finish and the maximum in resilience, are features of the finished bobby pin that milady looks for. Women pay handsome premiums for bobby pins that do have all these desirable qualities. Their discriminating selection dictates the specifications of the wire. Every wire worker has a similar problem to solve in order that his operation costs may be held to a minimum and his product command as high a price as possible. He must dictate as to the specifications of the wire he uses. Wickwire Spencer will gladly listen to his dictates and follow them.

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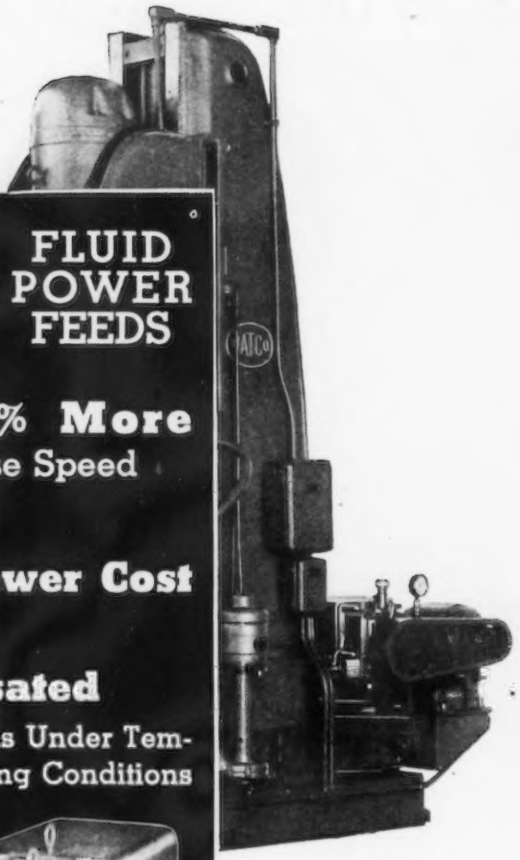
Wickwire Spencer manufactures High and Low Carbon Wires—in various tempers, grades and finishes—for your specific purpose. Hard-Drawn, soft or annealed Basic or Bessemer Wires—Hard-Drawn annealed, or oil-tempered Spring Wire, Chrome Vanadium Spring Wire — Valve Spring — Music — Clip — Pin — Hairpin — Hook and Eye—Broom—Stapling—Bookbinding—Machinery Spring Wire—Reed Wire—Clock—Pinion—Needle-Bar—Screw Stock—Armature Binding—Brush—Card—Florist—Mattress—Shaped—Rope—Welding. Flat Wire and Strip Steel, High or Low Carbon—Hard, annealed or tempered—Clock Spring Steel—Corrosion and Heat Resisting Wires. Consult the Wissco technical man on your wire problems, however large or small.

● *At Right:* Natco multiple spindle drill, Oilgear Fluid Power Feed equipped.



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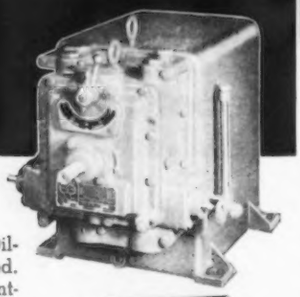


● *Above:* A new Oilgear Fluid Power Feed. Note: Flanged mounting, as integral machine part . . . Inside pump, eliminating hazard and bettering appearance . . . Self-contained; auxiliary valves, tubing, etc. are integral with pump . . . Many other exclusive features.

WITHOUT greatly altering existing machines, new speed and smoothness are achieved at new low cost by Oilgear's record-breaking new Fluid Power Feeds. Every builder, every buyer, should have the facts; get Oilgear's book. The OILGEAR Company, 1311 W. Bruce Street, Milwaukee, Wis.

OILGEAR FLUID POWER FEEDS

(B-1304)

International Harvester Co., 606 South Michigan Avenue, Chicago, plans new one-story factory branch, storage and distributing plant at St. Cloud, Minn. Cost about $40,000 with equipment. Present building on site is being razed. L. H. Hinz is branch manager at St. Cloud.

Penick & Ford, Ltd., First Street and Tenth Avenue, S. W., Cedar Rapids, Iowa, manufacturer of cereals and other food products, has let general contract to Lightner Brothers, 1058 Grand Avenue, S. E., for one-story addition, 120 x 300 ft., in part for storage and distribution. Cost about $75,000 with equipment.

Board of Education, Chisholm, Minn., Joseph Grams president, is considering purchase of turbine unit and auxiliary power equipment for lighting service at public schools. Cost about $25,000.

OHIO AND INDIANA

Carthage Distilling Co., 7818 Anthony Wayne Avenue, Cincinnati, has plans for seven-story and basement addition, primarily for storage and distribution. Cost close to $100,000 with equipment.

B. F. Goodrich Co., Akron, Ohio, has leased three-story building, about 18,000 sq. ft. floor space, at 5734-38 Baum Boulevard, Pittsburgh, for new factory branch, storage and distributing plant.

Libbey-Owens Ford Glass Co., Nicholas Building, Toledo, Ohio, has authorized fund of $1,700,000 for extensions and improvements in plants at Rossford, near Toledo; Ottawa, Ill., Shreveport, La., and Charleston, W. Va., to include new units and installation of machinery, primarily for safety glass manufacture. D. H. Goodwillie is executive vice-president.

Union Pipe Fitting Co., Union City, Ohio, has been organized by B. M. Taylor and Russell E. Warren, Union City, care of Edna C. Wright, Greenville, Ohio, representative, to manufacture pipe fittings and kindred iron specialties.

Material Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until April 29 for spline and taper gage assemblies, head assemblies, checking fixture and propeller blade gage (Circular 677), one wind tower direction indicator (Circular 676), steel sash and tee bar mullions (Circular 679); until May 1, flexible conduits (Circular 643), 30 propeller protractor assemblies (Circular 675); until May 2, clevis bolts, aircraft bolts, flat head pins, turnbuckle assemblies, etc. (Circular 673); until May 9, 71 tachometer assemblies (Circular 675), 220 36-in. wheel assemblies, 110 left-hand and right-hand brake assemblies respectively (Circular 672).

Castype Corpn., Ames and Crystal Streets, Anderson, Ind., has been organized by Chester A. Macomic, Victor S. Rice and J. L. Watts, Anderson, to manufacture type-casting and type-setting machines and parts.

Spur Distributing Co., Nashville, Tenn., has leased property, 150 x 150 ft., on East Michigan Street, Indianapolis, for new bulk oil and gasoline storage and distributing plant. Cost over $30,000 with steel tanks and other equipment.

SOUTH CENTRAL

Ralph Greenbaum & Co., Inc., Frankfort, Ky., distiller, has taken over site of former distilling plant of J. S. Greenbaum Distillery, Midway, Ky., for new plant. Several existing buildings will be remodeled and new units erected. Equipment will be installed for main distillery, mechanical-bottling, storage and distribution and other departments. Cost close to $100,000 with machinery. Carl J. Kiefer, Schmidt Building, Cincinnati, is consulting engineer.

Frank Dantoni & Co., Gallatin Street, New Orleans, manufacturer of macaroni and other food products, plans extensions and improvements in three-story factory, including new equipment. Cost about $30,000. Samuel Stone, Jr., & Co., Masonic Temple Building, are architects.

Dant Distilling Co., Louisville, care of J. P. Dant, 1718 Windsor Place, head, has plans for new works at Meadowlawn, near Louisville, where site has been acquired. Plant will include power house and machine shop. Cost about $60,000 with equipment.

Board of Water Commissioners, East Jefferson Water Works District No. 1, Jefferson Highway, Shrewsbury, La., asks bids until April 30 for maintenance tools and equipment, 10,000 ft. copper tubing, two tapping machines, 1000 water meters, meter repair parts, one 1½-ton maintenance truck, one ½-ton pick-up truck, and other equipment. Scott & Brothers, Maritime Building, New Orleans, are consulting engineers.

Brown Fence & Wire Co., Florida Street, Memphis, Tenn., plans one-story addition for storage and distribution. Cost about $35,000 with equipment.

WASHINGTON DIST.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until May 10 for cable, bolts, washers, fuses, fittings, etc. (Circular 127).

Appalachian Electric Power Co., Roanoke, Va., plans new power transmission line from Grundy, Va., to Coal Creek district, about 20 miles. Cost close to $50,000 with equipment.

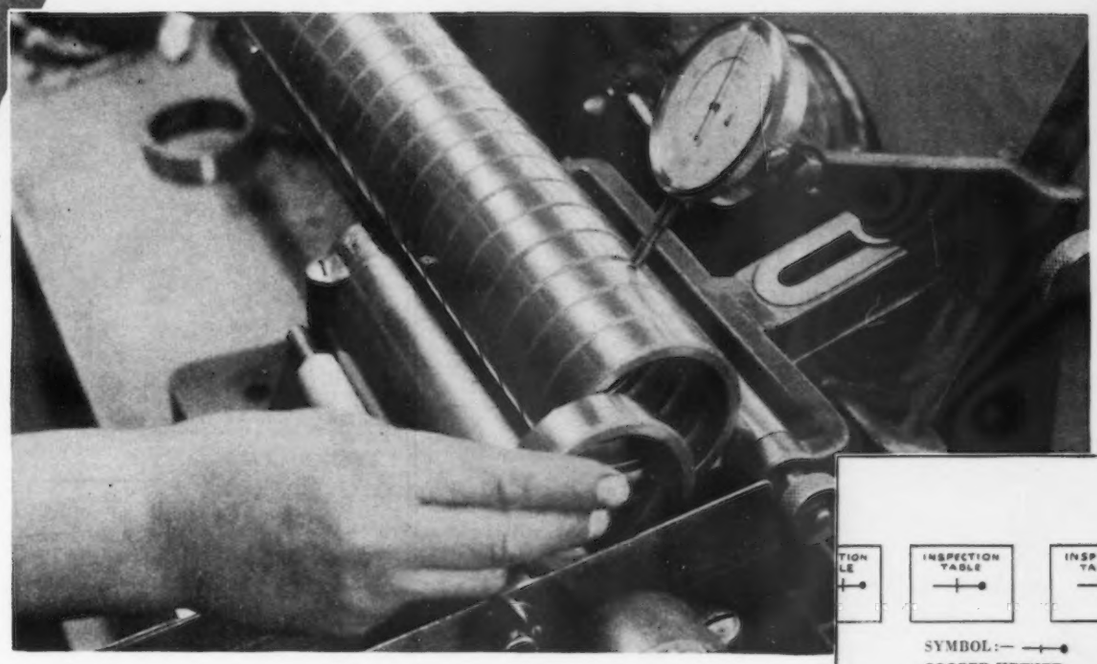
Commanding Officer, Nansemond Ordnance Depot, Portsmouth, Va., asks bids until May 1 for one wet tool grinder, one motor buffer, one drill pointer, all motor driven, and one planer vise (Circular 53).

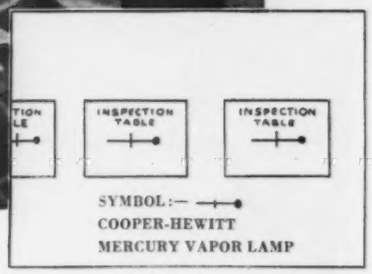
General Purchasing Officer, Panama Canal, Washington, asks bids until April 29 for 100,000 ft. twisted pair rubber-insulated cable, 10,000 ft. copper wire, magnet wire, steel tiller wire rope, soft steel wire, 14,000 ft. wire rope, electric water heaters, panel boards, snap switches, steel tubing, 12 sets knives, bar cutters, etc. (Schedule 3048).

BETTER THAN DAYLIGHT

Better Sight during production

MINIMIZES INSPECTION REJECTS





A few ten-thousandths plus or minus are the limits of variation this industry can tolerate. Here at one of the final inspections they keep a constant check to see how well their production "tools" have done their work. Rejects are few, they have sealed the profit leaks at their source in the production line with Cooper-Hewitt light.

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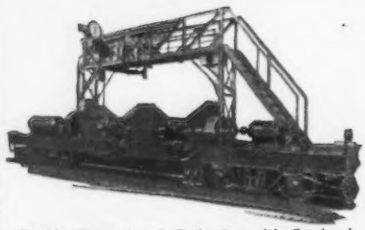
ATLAS CARS



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Special Cars and Electrically Operated Cars for every conceivable purpose.

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Engineers - Manufacturers

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Baltimore Pure Rye Distilling Co., Sollers Point Road, Dundalk, Baltimore, has asked bids on general contract for new six-story plant unit, 120 x 163 ft., for storage and distribution. Cost close to $100,000 with equipment. C. H. Osborne, 222 West Franklin Street, is consulting engineer.

Construction Service, Veterans' Administration, Washington, asks bids until May 14 for metal lockers, bins and shelving for institution at Roanoke, Va.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 3 for 24 pairs interconnecting gears for Washington Navy Yard (Schedule 4835), one motor-driven engine lathe for submarine base (Schedule 4839), 10,000 extractors for cartridge tanks for Portsmouth Navy Yard (Schedule 4837), steam sirens and spare parts (Schedule 4796); until May 7, corrosion-resisting steel castings for breechings (Schedule 4865), electric cable (Schedule 4848), two automatic generator voltage regulators (Schedule 4843); until May 10, steel welding elbows (Schedule 4873) for Eastern and Western navy yards.

SOUTHWEST

Chevrolet Motor Co., Union Boulevard and Natural Bridge Avenue, St. Louis, headquarters at Detroit, has let general contract to Gamble Construction Co., 620 Chestnut Street, St. Louis, for one-story addition to local assembling plant. Cost about $125,000 with equipment. Albert Kahn, Inc., Detroit, is architect and engineer.

Purchasing Officer, Department of Interior, St. Louis, asks bids until June 7 for heaters as required for Indian Service during fiscal year 1936 (Schedule 16).

City Council, Pattonsburg, Mo., asks bids until April 30 for two 150-hp. Diesel engine units and accessories for municipal electric light and power plant; also electrical distribution lines. Cost about $65,000. E. T. Archer & Co., New England Building, Kansas City, Mo., are consulting engineers.

Memphis Compress & Storage Co., Cotton Exchange Building, Memphis, Tenn., has plans for new cotton compress and storage and distributing building at Wilson, Ark. Cost about $100,000 with compresses and auxiliary machinery, mechanical-handling equipment, etc.

Small Mfg. Co., St. Louis, manufacturer of packaging machinery and parts, care of John A. Lorenz, 7820 Forsythe Street, architect, has let general contract to W. J. Kenton, 3626 Gasconade Street, for new one-story plant. Cost about $25,000 with equipment.

Board of Education, 409 East Weatherford Street, Fort Worth, Tex., Edward P. Williams, business manager, plans manual training department in new multi-story Rosemont junior high school, for which general contract has been let to Thomas S. Byrne, Inc., Fort Worth National Bank Building. Cost about $200,000. Elmer G. Withers Architectural Co. and E. A. Van Horn, both Holmes Building, are architect and engineer respectively.

PACIFIC COAST

Luer Packing Co., 3026 East Vernon Avenue, Los Angeles, meat packer, has filed plans for one-story addition, 136 x 180 ft. Cost close to $50,000 with equipment. Harry Dodd will be in charge of erection.

Consolidated Paint Co., 136 Sotello Street, Los Angeles, has let general contract to C. O. Napper, 306 Columbia Avenue, for new one-story plant, 56 x 100 ft. Cost about $25,000 with equipment.

Bureau of Reclamation, Denver, asks bids until May 2 for one hydraulic control board for control division, Boulder power plant, Boulder Canyon, Arizona-California-Nevada (Specification 675-D).

Kern Syrup & Preserving Co., 910 Mateo Street, Los Angeles, has plans for new one story plant, 180 x 200 ft., for processing and canning. Cost about $35,000 with equipment. George J. Fosdyke, 112 North Main Street, is engineer.

Yakima Valley Brewing Association, Selah, Wash., has taken over three buildings on Fruit Row, and will remodel for new plant, including main brew-house, mechanical bottling works, storage and distributing unit. Cost over $45,000 with equipment.

St. Helens Pulp & Paper Co., St. Helens, Ore., manufacturer of kraft wrapping papers, gummed paper stocks, etc., has let general contract to G. H. Buckler Co., Lewis Building, Portland, for one and two-story addition, 100 x 200 ft. Cost over $100,000 with equipment. Walter Anderson is chief engineer.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 3 for one motor-driven engine lathe (Circular 4840); until May 7, packing for electric stuffing tubes (Schedule 4866); until May 10, one 14-in. pipe flange facing machine (Schedule 4842) for Puget Sound Navy Yard; 16 electric searchlights and spare parts (Schedule 4871), 70,000 practice bombs and 3000 suspension bands (Schedule 4864), for Mare Island yard.

Hauser Packing Co., 2300 East Ninth Street, Los Angeles, meat packer, subsidiary of Armour & Co., has plans for three-story addition, 32 x 45 ft. Cost about $40,000 with equipment. W. W. Ache, 1616 Fourth Avenue, is architect.

FOREIGN

Imperial Chemical Industries, Ltd., London, England, is acquiring property near Adelaide, Australia, for new plant for production of soda ash and allied alkali specialties, with power house, machine shop and other structures. Cost over $600,000 with machinery.

Association for Chemical and Metallurgical Production, Ltd., Aussig, Czechoslovakia, has acquired controlling interest in Boehmische Glanzstoff Fabrik, Ltd., Lobositz, Czechoslovakia, manufacturer of cellulose rayon products. New owner plans new buildings and equipment. Cost close to $500,000 with machinery.

Staple Fiber Developments, Ltd., Manchester, England, care of Bantock Reynolds, 103 Kingsway, London, W. C., recently organized by Mr. Reynolds and associates, plans early erection of new works for production of viscose fiber specialties. It is proposed to arrange financing totaling about $10,000,000. Initial mill will cost over $1,000,000 with equipment.

Utility and salability are the two most striking characteristics of the completely redesigned packages and cartons in which the tack products of Republic Steel Corpn., Chicago, Ill., are now packed. Many of Republic's Grand Crossing quality tacks are packed in packages of distinctive design which identify the kind, size and finish of tack at the first glance. This makes it much easier for the retailer to handle the packages and, at the same time, enables the user to select the proper box from a miscellaneous assortment without hesitancy.

Methods of hardening cast iron will be described by J. S. Vanick, development department, International Nickel Co., at a meeting of the Chicago section of the American Foundrymen's Association, to be held on the evening of June 6 at the Medina Athletic Club, 505 North Michigan Avenue. Mr. Vanick will also discuss the relative merits of hardening cast iron by casting against chills, cyaniding, nitriding, heat treating and alloying, and will outline recent developments in the applications of each process.

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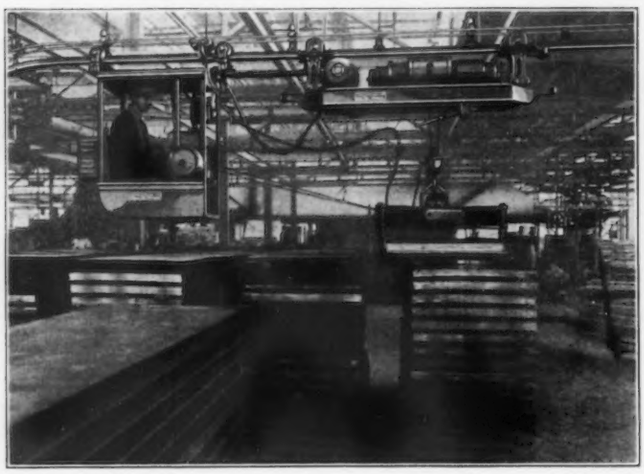

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DIVISION OF
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WICKLIFFE OHIO

Dry Dedusting of Blast Furnace Gas

(CONTINUED FROM PAGE 21)

ticle in the apparatus, while in operation, is given by

$$C = \frac{mV^2}{R} \tag{5}$$

where C is the centrifugal force in dynes, m is the mass of the particle, and R is the distance in centimeters from the rotation axis to the center of the particle in a given moment of time.

The frictional resistance encountered by a particle, according to equation (1), is $F = 6\pi nru$, where u is the velocity of the particle in a radial direction expressed in cm. per sec.

A particle travels at such a velocity in a radial direction through the gas flow that the frictional resistance it experiences neutralizes the centrifugal force applied to it, i. e., it is possible to write the equation as follows:

$$\frac{mv^2}{P} = 6\pi nru \tag{6}$$

In equation (6), v equals the circumferential speed of the particle at a distance P from the axis; therefore $v = PQ$, where Q is the angular velocity expressed in c.g.s. units. The effective mass, m, of the particle according to equations (2) and (3) is

$$m = 4/3\pi r^3(w - w')$$

After proper substitution, equation (6) can be written as follows:

$$nu = 2/9\, r^2PQ^2(w - w')$$

Hence

$$u = 2/9\frac{r^2PQ^2}{n}(w - w') = \frac{dP}{dt}$$

then

$$dt = \frac{9n}{2r^2Q^2(w - w')}\frac{dP}{P}$$

which integrates into

$$= \frac{9n}{2r^2Q^2(w - w')}\int_{R_1}^{R^2}\frac{dP}{P} \tag{7}$$

$$= \frac{9n\, ln\frac{R_2}{R_1}}{2r^2(w - w')Q^2}$$

This value of t is the time necessary for the particle to travel through the annular space between the barrel and wire-net cylinder.

(CONTINUED ON PAGE 88)

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•

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Chasers are interchangeable with the Type CO rotating heads.

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$$R_1 = \frac{D_1}{2}$$

= inside radius of the annular space.

$$R_2 = \frac{D_2}{2}$$

= outside radius of the annular space.

Therefore from equation (7), the angular velocity (Q) can be determined:

$$(8) \qquad Q = \sqrt{\frac{9n \ln \frac{R_2}{R_1}}{2tr^2(w-w')}}$$

The time necessary for a separation of the dust particle must be equal to the time of travel of the gas through the cleaner. In the case herein this time can be determined in the following way: The volume of gas passing the cleaner at 170 deg. C. is

$$\frac{(11.4)\ (273 + 170)}{273}$$

= 19 cubic meters per second.

The area of the annular space in the cleaner is equal to $S =$

$$\frac{\pi(D_2^2 - D_1^2)}{4} = 6.28 \text{ sq. m.}$$

The velocity of gas in the cleaner is $\frac{19}{6.28}$, or about 3 meters per second.

As the height of the barrel is 8 meters, so the time of gas travel through the cleaner will be $t =$ 8/3 = 2.67 sec. The viscosity of the blast furnace gas at temperature 170 deg. C. for the analysis previously described is 0.00022 dyne-sec. per sq. cm.

Substituting all of these values into formula (8), it is possible to determine the angular velocity of the barrel. The result equals $Q =$ 30.4.

Hence, the number of revolutions of the barrel is equal to

$$N = \frac{Q(60)}{2\pi} = \frac{(30.4)\ (60)}{2\pi}$$

= 290 revolutions per minute.

Thus the above calculations prove that very fine cleaning can be obtained in the system described if the barrel revolves at a rate not less than 290 r.p.m. The particles which cannot be removed in the cleaner are so light that, on using the gas in stoves, metallurgical furnaces or under boilers, they will be carried with the gas flow through the flues without settling. Apparently a large majority of these particles which pass are coke particles. These particles which remain in the gas will burn away in the stoves or metallurgical furnaces.

Four Major Advantages

The advantages derived from a cleaner of this type are as follows:

(1) The heat contained in each unit of the gas is higher than in the case of wet cleaning.

(2) A greater cleanliness in the blast furnace plant on account of the smaller quantity of sludge from gas cleaning.

(3) Low operating cost.

(4) Low cost of installation of cleaner.

The gas must not be cooled down before passing the cleaner, therefore it contains some part of furnace heat in addition to its normal thermal value. Thus the total heat contained in it is larger. The quantity of sensible heat in one cubic meter of gas at 170 deg. C. can be examined in Table III.

TABLE III

Analysis of Gas, Per Cent	Specific Heat, Cp. per Met.	Heat Content at 170 Deg. C., Cal.
CO_2 =12.4	0.37	7.81
CO =25.9	0.279	12.30
N_2 =53.6	0.281	25.60
H_2 = 2.6	0.282	1.25
CH_4 = 0.5	0.39	0.38
H_2O = 5.0	0.35	2.98
Total 100.0		50.27

The gas under standard conditions of zero deg. C. and 760 mm. of mercury contains 935 cal. per cubic meter, and at 170 deg. C. it receives additional heat, which equals 50.27 cal. Total heat is 935 + 50.27 = 985.27 cal., i. e., the heat content of the gas rises 5.4 per cent.

The second advantage of this dry dedusting system lies in the greater facility by which it is possible to handle the flue dust in a dry state than in the form of mud or slime in the wet-cleaning process.

The operation cost of a given apparatus is low. At the capacity of the cleaner, 19 cubic meters per sec. or 68,400 cubic meters per hr., a drive motor of only 50 hp. (36.8 kw.) is required. The power consumed per 1000 cubic meters is $\frac{36.4}{68.4}$ = 0.54 kw.

For each cubic meter of cold gas the power consumption will be 0.90 kw. Water is used only to cool the bearings and stuffing boxes, and the water consumption is about 3 liters per sec., or 0.26 cubic meter of water per 1000 cubic meters of cold gas.

The cost of the cleaner is not high. For a capacity of 200 cubic meters per hour the weight of the whole apparatus is 70 tons, of which only 7 per cent represents mechanical parts.

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Late Returns from Laboratory and Mill

(CONTINUED FROM PAGE 27)

compounds and eliminates the resultant oxides by volatilization.

The same company has also developed a sodium lead alloy, containing 12 per cent sodium, for performing the same function in the manufacture of non-ferrous castings containing lead.

Table 1

Effect of Seawater Immersion on the Physical Properties of Various Metals

Type of Metal	Corrosion Mg./sq. dm./day	Loss of Tensile Strength (Per Cent)	Loss in Elongation (Per Cent)
Electrolytic copper	12.2	5.88	23.1
Phosphorized copper	14.7	14.4	26.2
Copper-silicon-manganese alloy	11.8	15.4	32.2
Tin bronze	6.5	6.9	1.1
Aluminum bronze (5 per cent)	8.2	4.9	12.6
Aluminum bronze (8 per cent)	2.8	3.6	0
Aluminum bronze (10 per cent)	5.9	3.0	72.9
Low carbon, Ni-Cr-Fe alloy	0.08	1.5	24.3
Manganese bronze	20.5	60.8	97.1
Rich low brass	15.2	14.7	20.1
Deep drawing brass	13.5	15.3	17.9
Admiralty metal	11.9	12.3	1.4
Cu-Ni-Zn alloy	8.6	8.9	16.3
Cu-Ni-Sn alloy	5.5	2.5	27.9
Cupronickel	8.8	10.4	25.2
Nickel-copper alloy	6.0	5.0	22.3
Nickel	5.0	2.5	23.4
Iron-chromium alloy	29.3	16.9	61.9
Iron-chromium-nickel alloy	0.9	5.9	40.6

New Metallic Resistor Operates at 2300 Deg. F.

FURNACES using metallic resistor elements of the nickel-chromium series are usually limited to a maximum temperature of 2000 deg. F. Until recently, the silicon carbide type of resistor has been the only alloy available for higher temperatures. The newest contribution to this field is that of the Hevi Duty Electric Co., Milwaukee, Wis., and consists of a unique type of resistor wire adaptable for furnaces heating up to 2300 deg. F. Break-down tests on this new material indicate an element life at 2300 deg. F. comparable to normal expectancy of nickel-chromium operating at 1850 deg. The new wire has a resistance 45 per cent greater than nickel-chromium and a higher current carrying capacity, which results in ample kilowatt capacity to handle the increased temperature requirements. This type of resistor is particularly adaptable to furnaces wherein uniformity and accuracy of temperatures are desired for the forging of steel, reheating billets, brazing, annealing of stainless steel, etc.

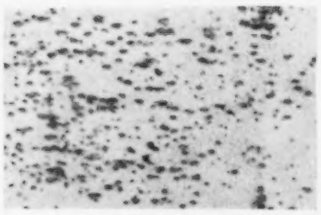

FIG. 2—Porosity of tin plate determined by a hot-water test. Adherent rust spots form at the pore sites. Above is 1½-lb. stock and below is 3½-lb. stock. At three diameters.

Internal Grinders.—Landis Tool Co., Waynesboro, Pa. Catalog No. E-35, 12 pages, giving details of new 15-in. type C hydraulic internal grinders.

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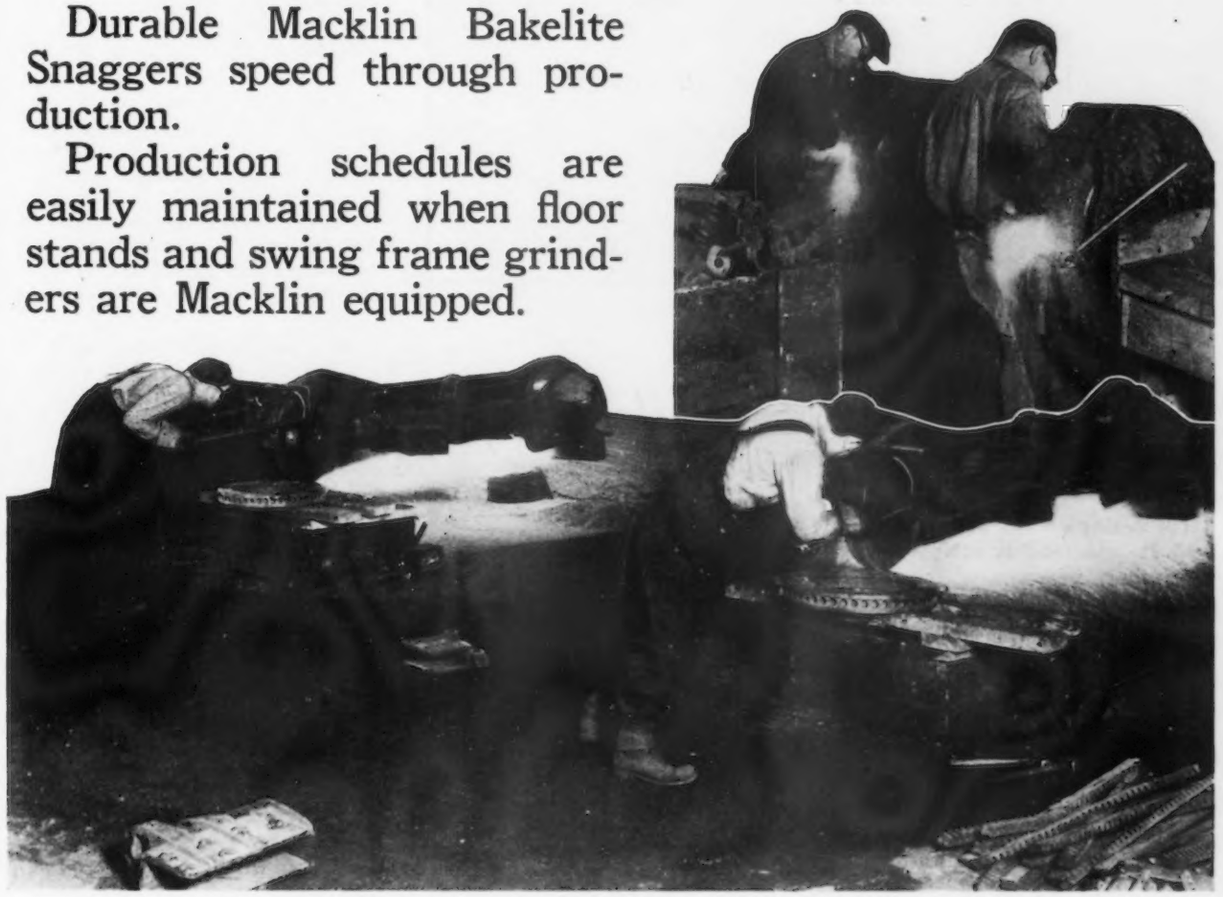

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Making Porcelain Kitchen Ware

(CONTINUED FROM PAGE 31)

The drying oven is 60 ft. long and 15 ft. wide and is equipped with traveling conveyors of the looped chain type. In order to operate this oven at its greatest capacity the conveyors are placed one above the other. Close to the floor are three pairs of moving chains and the work to be dried is placed on slabs and the slabs placed on the chains. Above these are two moving looped chains with suspended tools on which the work is placed. This dryer is heated by waste heat from the vitrifying furnaces, while auxiliary heat is furnished by a series of gas burners.

The ground coat is dipped on, two methods being employed, slush and drain. By the first the item is dipped and then whirled and manipulated by hand so as to provide an even coating. If, however, a thicker coat is required it is dipped and drained only. Dip tubs are placed at both ends of the dryer and the coated work is placed directly on conveyors, which operate in opposite directions. After being headed, brushed and inspected, the ware is fired.

There are eight enamel furnaces of the double chambered, batch type, and each is 4 x 10 ft. The walls of these furnaces are composed of 9 in. of common brick, 4½ in. of insulated brick, 9 in. of high-grade refractory brick, and inside this is a full muffle of cupped tile 1½ in. thick. A space between the muffle and wall allows circulation of the hot products of combustion around the muffle. Heat is supplied by four gas burners firing under the hearth, two in front and two in the rear. A counter-weighted door is operated by motor and remote control.

Each furnace is provided with two speed forks for loading and unloading, and each furnace consumes 1000 cu. ft. of 1000-B.t.u. gas per hr. When the ground coat is burned on, the ware is removed and the two cover coats are sprayed on, beaded and burned successively. There are long lines of spray booths for this operation. The ground coat is burned or vitrified on at 1600 deg. F. and each of the cover coats at from 1500 to 1550 deg. F. From 2 to 3½ min. in the furnace is required for each coat. The ware is then sorted, inspected, packed and shipped.

New Pittsburgh Engineering Firm

STEEL & ENGINEERING, INC., 7501 Thomas Boulevard, Pittsburgh, has been formed to warehouse steel sheets and to manufacture various steel stampings and certain patented steel mill devices, including an ingot pouring machine for teeming steel ingots continuously and at a constant reduced head pressure. Officers are William S. Orr, president and secretary, and M. G. Dumas, vice-president and treasurer. Directors, in addition to the officers, are William B. Jaspert, C. W. Brueck and Grier C. Orr.

William S. Orr was chief engineer for the Central Alloy Steel Corpn. up to 1929, about the time of that company's merger with Republic Steel Corpn. Subsequently he spent several years in Soviet Russia on the engineering staff of the Freyn Engineering Co., Chicago. He returned from Russia recently.

Mr. Dumas has been metallurgist for American Steel Foundries at Chicago and for the Trumbull Steel Co. of Warren, Ohio, and for the past six years has been vice-president of the Dumas Engineering Co. of Youngstown, Ohio. He is also the inventor of patented hot tops manufactured and sold exclusively by the New Castle Hot Top Co., New Castle, Pa., and other steel mill devices for which patents are held by the Dumas Engineering Co.

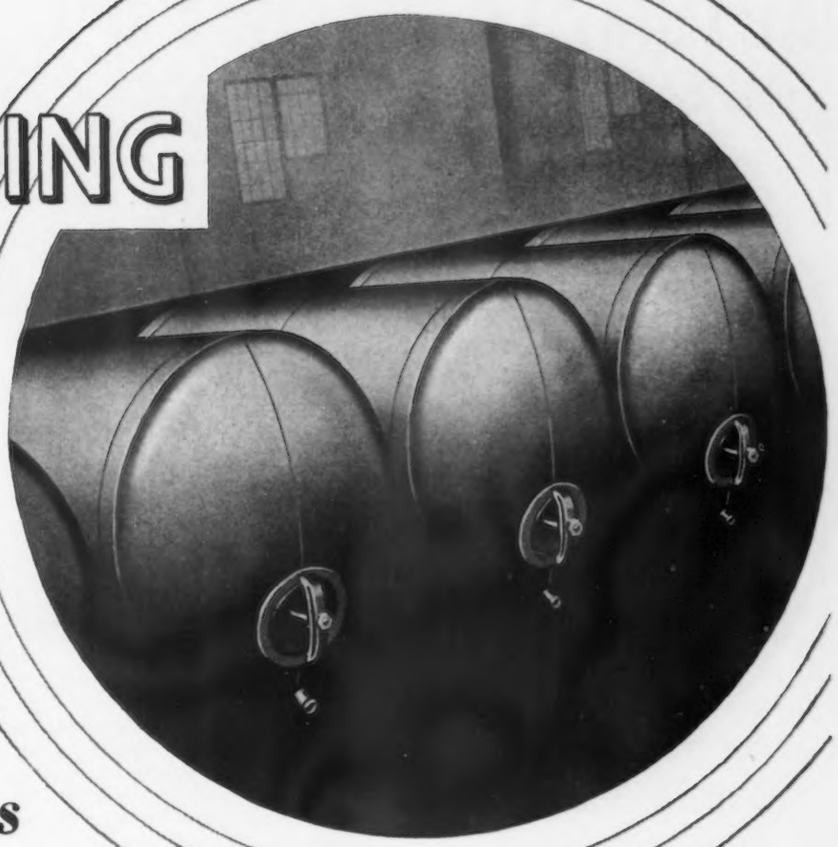
Mules Shod with Non-Sparking Shoes

MULES in coal mines are being shod with bronze shoes rather than with iron or steel shoes. Iron shoes are taboo because of the explosion hazard. Hence non-sparking bronze shoes are used.

For a similar reason bronze and beryllium copper chisels, wrenches, hammers and other hand tools are used instead of steel tools in oil refineries, especially when they are located at remote points, such as the East Indies, where in case of an explosion operations would suffer prolonged delay pending the arrival of replacement equipment.

Non-sparking mule shoes and hand tools are made of Ampco, a special bronze, and of beryllium copper by Ampco Metal, Inc., 3830 Burham Street, Milwaukee.

OXWELDING



makes Stainless Steel Tanks Jointless

These 1200 gallon welded tanks are of stainless steel. The stainless steel is inherently light, strong, durable, and corrosion resistant. Welding makes it jointless, easy to clean and forever tight and leakproof. These salient features could be added by no other means than welding.

Almost without exception, welding makes a good product better. Makes it more salable, more profitable at the same fabricating cost. Everything for oxy-acetylene welding and cutting—including Linde Oxygen, Prest-O-Lite Acetylene, Union Carbide and Oxweld Apparatus and Supplies—is available from Linde through producing plants and warehouse stocks in all industrial centers. Linde also has available a vast amount of information and experience on the welding of all kinds of metals into a vast variety of products. It is available for your use.

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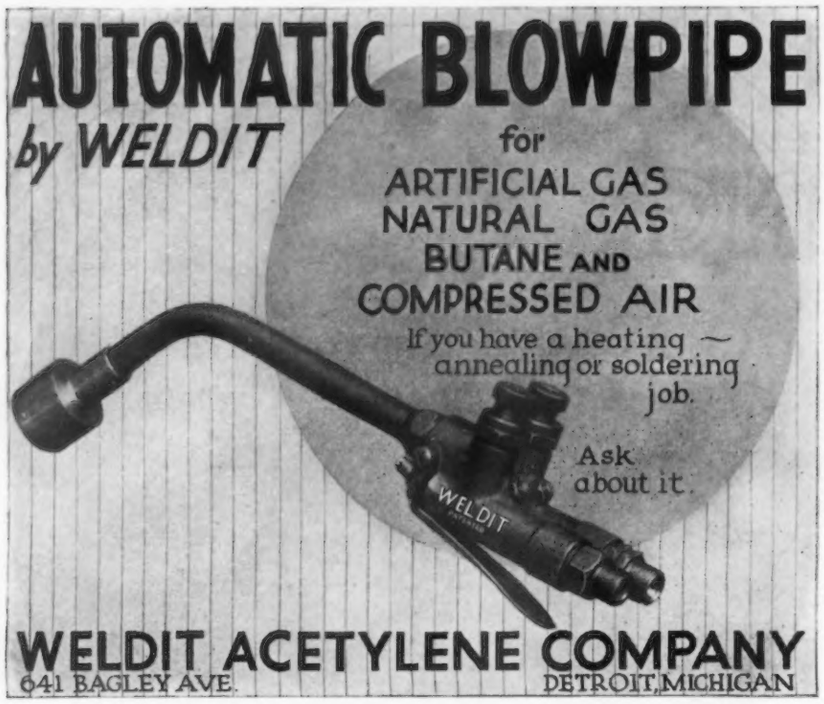
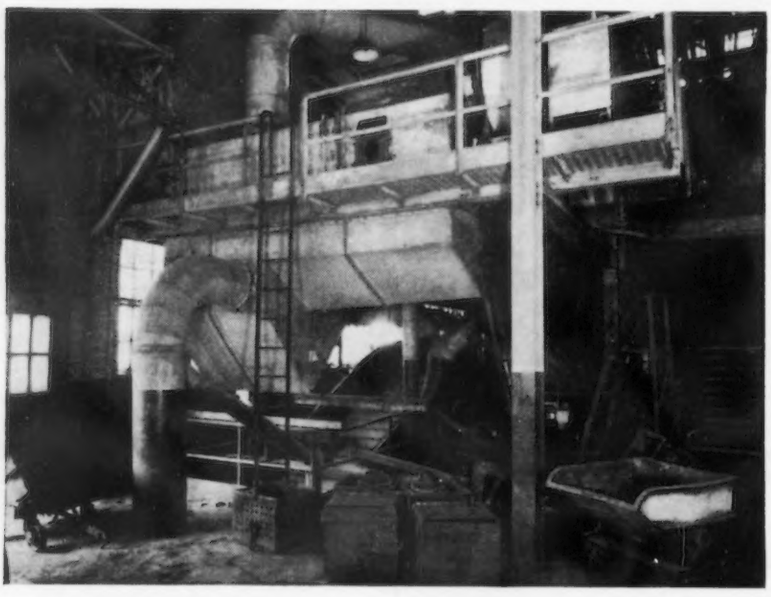


Air Filter Employs Frothing Agent

THE first installation of a new type of industrial air filter for removing the dust from waste sand created in revolving screens and foundry knockout has been installed in the gray iron foundries of the General Motors Co., Saginaw, Mich. This is designated as the Traughber Froth Flotation air filter, and was brought out recently by the C. O. Bartlett & Snow Co., Cleveland.

The filter employs a frothing agent to filter the dust-laden air and operates on the flotation principle. The water removes the larger dust particles from the stream of air, and the finer dust particles which the water cannot remove are trapped by a frothing filter carpet on the surface of the water.

The dust-laden air is drawn into a distributing chamber and is forced upward through nipples into 98 bells or bubble caps 9 in. square. The air passes through the water and then through the filter carpet. The dust-laden water and foam are deflected downward by the bubble caps, pass through a trap and are carried outside, where the sand is later recovered. The air when discharged from the filter is said to be practically dust-free. It is carried out by an exhaust fan. The equipment has no moving parts.



The air filter installed is rated to filter 12,500 cu. ft. of air per min., but is cleaning 24,000 cu. ft. per min. The equipment is 7 ft. x 14 ft. in dimensions and is located at one end of the knockout room. The dust-laden air is delivered to the filter through two 22-in. and one 11-in. duct that are connected to housings above a screen and apron conveyors that feed to the screen. The water consumption is about 20 gal. per min. Pine oil is used as a frothing agent, although soap may be used for that purpose.

Predicts Improvement in Shipbuilding

IN his report to the members of the National Council of American Shipbuilders at its annual meeting in Cincinnati, H. Gerrish Smith, president, informed the members that notwithstanding the present very low ebb in the building of merchant vessels there are unmistakable signs of improvement in world shipping which should better conditions in the shipbuilding and ship repairing industry of the United States.

These indications show:

1. A substantial increase in foreign trade during 1934 as compared with 1933. Returns for 1934 disclose a combined export and import trade of at least 25 per cent in excess of that for 1933.

2. A notable increase in traffic through the Panama Canal. There was a 16 per cent increase of commercial transits in 1934 over 1933; a 14 per cent increase in Panama Canal net tonnage; a 23 per cent increase in cargo tonnage; and a 13 per cent increase in tolls collected.

3. A marked decrease in idle tonnage. The tonnage of idle world ships at the beginning of 1935 was 26 per cent less than at the beginning of 1934 and 49 per cent less than at the beginning of 1933. While a part of this reduction has been due to scrapping laid up tonnage, a considerable part, nevertheless, is due to the reinstatement into trade of vessels that had been laid up for lack of business.

Mr. Smith stated that the improvement in world shipping has brought about better conditions in the shipbuilding industry in foreign countries but not as yet in the United States.